COTTON

Volume LXXXI
Number Four
Ten Cents a Copy

FEBRUARY, 1917

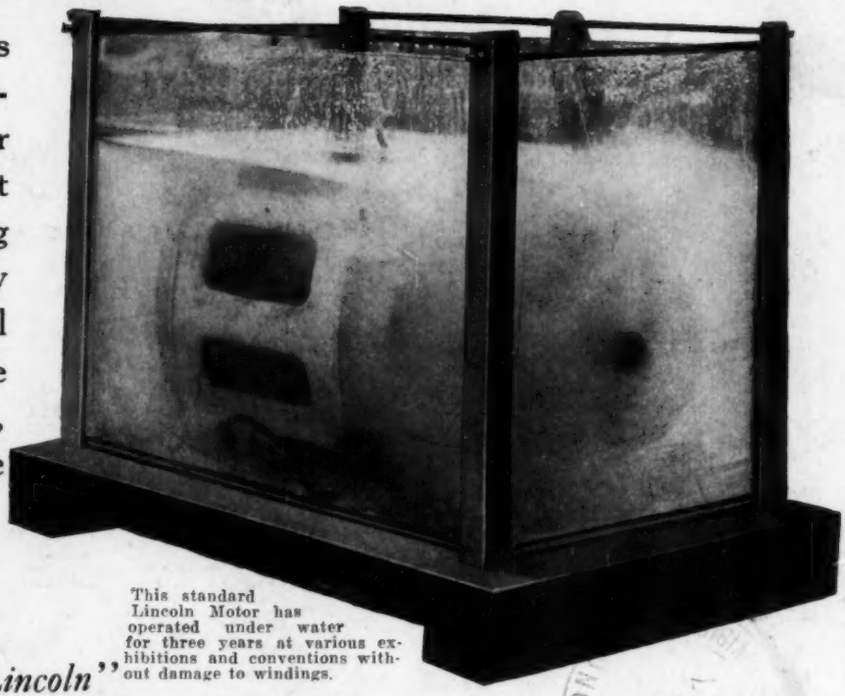
Published Monthly by
W. R. C. Smith Publishing Co
Dalton, and Atlanta, Ga.

SIMPLICITY HONESTY

LINCOLN MOTORS

RELIABLE POWER

Lincoln Motors have given **positive proof** of their reliability — not by this striking test alone, but by years of actual service under the worst of dust, lint and moisture conditions.



This standard Lincoln Motor has operated under water for three years at various exhibitions and conventions without damage to windings.

Write for Bulletin No. 101-N

"Link Up With Lincoln"

The Lincoln Electric Co., CLEVELAND, OHIO. CHARLOTTE, N. C.

New York City
Singer Bldg.
Buffalo
Syracuse

Chicago
Columbus
Detroit
Grand Rapids

Philadelphia
Pittsburg
Toronto, Canada

Agencies in other principal cities.

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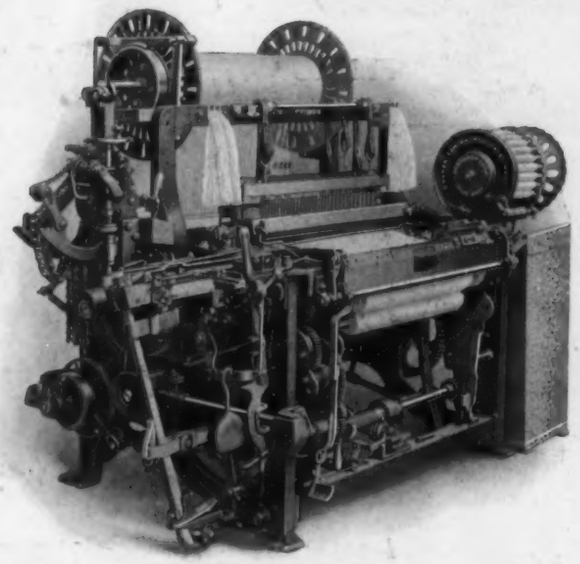


NORTHROP LOOMS

TRADE-MARK REGISTERED

The Northrop Turkish Towel Loom illustrated above saves more in proportion than the Northrop Loom on plain goods.

DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

Southern Office
168 South Forsyth St. Atlanta Georgia

Copyright 1916 by Draper Company

NORTHROP

Trade-Mark Registered

LOOM REPAIRS

Our loom repair prices are purposely made low as we are mutually interested with our customers to keep the annual loom repair account low.

Job foundries, machine shops and supply houses do not have our interest in the results obtained from Northrop Looms.

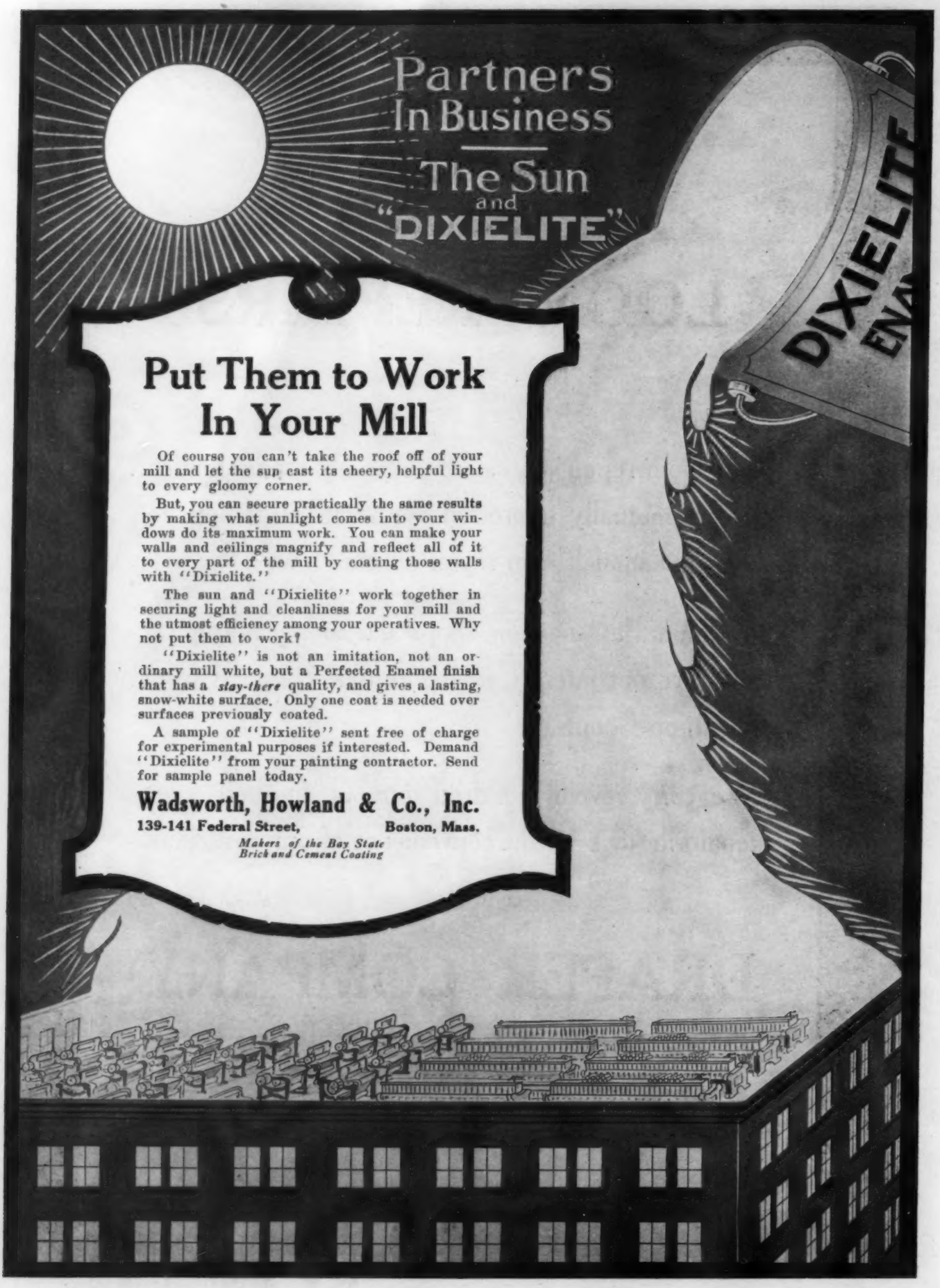
We carry several hundred tons of finished loom repairs in stock for the convenience of our customers.

DRAPER COMPANY

HOPEDALE MASSACHUSETTS

Southern Office
188 South Forsyth Street Atlanta Georgia

Copyright 1916 by Draper Company



Put Them to Work In Your Mill

Of course you can't take the roof off of your mill and let the sun cast its cheery, helpful light to every gloomy corner.

But, you can secure practically the same results by making what sunlight comes into your windows do its maximum work. You can make your walls and ceilings magnify and reflect all of it to every part of the mill by coating those walls with "Dixielite."

The sun and "Dixielite" work together in securing light and cleanliness for your mill and the utmost efficiency among your operatives. Why not put them to work?

"Dixielite" is not an imitation, not an ordinary mill white, but a Perfected Enamel finish that has a *stay-there* quality, and gives a lasting, snow-white surface. Only one coat is needed over surfaces previously coated.

A sample of "Dixielite" sent free of charge for experimental purposes if interested. Demand "Dixielite" from your painting contractor. Send for sample panel today.

Wadsworth, Howland & Co., Inc.

139-141 Federal Street, Boston, Mass.

Makers of the Bay State Brick and Cement Coating

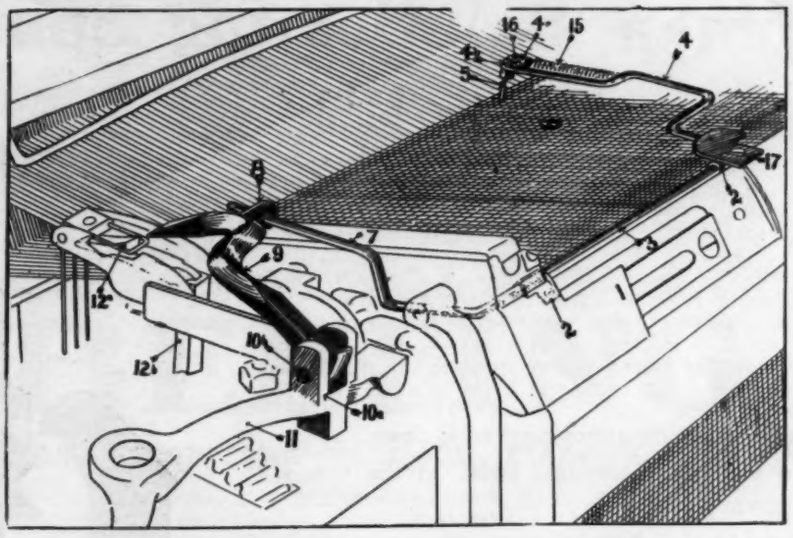
Free Your Product From Thin Places

There's No Excuse

for "seconds" from "thin places" in your mill, just because you are running automatic looms.

You (and you have not been alone) may have believed this to be a "necessary evil" but when we tell you that 62,000 Draper Automatic Looms, from Maine to Louisiana, are running daily, the product of which is absolutely free from Thin-Places, we know you will be immediately interested in knowing all about this plan of relief.

The answer is C. & B. Automatic Thin Place Preventers.



Now, to say nothing of the yearly, monthly, weekly and daily trouble and worry caused by these Thin-Places, what would it be worth to your mill in Dollars and Cents to have *complete relief?* We know you will be surprised to learn that the small sum of $2.00 per loom will enable you to forget all about Thin-Places. Without expense or any sort of obligation on your part we will gladly send literature and *samples for test.*

Clayton & Bentley Company

127 Madison, Ave., Atlanta, Ga.

C. & B. Automatic Thin Place Preventer

Are You Preparing for Future Competition?

Some of America's canniest, most far-sighted mill men are *already* anticipating the keener struggle for business of the near future.

They are planning how to enlarge again the margins of profit—now being rapidly reduced by rising costs of raw materials *like coal* and by labor—when their product will not be sold at war prices. They are displacing their inefficient equipment by the more recent inventions, like *ball-bearing machinery*, which provide

Lower Power Costs **Higher Quality**
Greater Strength **Increased Production**

Do you wish *your* mill to have these same advantages? You can, in the spinning room, and pay for the new equipment out of *immediately decreased manufacturing costs*, by installing

Chapman Ball-Bearing Spindles

New, Improved 1917 Model

Manufactured for more than five years, and installed in a rapidly increasing number of mills throughout the country, these revolutionary spindles are no longer an experiment. Installed in **your** mills, Chapman Ball-Bearing Spindles will definitely do these 7 things:

1—Save 30% on the horse power needed to run your spinning frames.

2—Practically eliminate annoying "ends down."

3—Maintain the full theoretical twist, giving you a more uniform yarn.

4—Spin from 5 to 15% stronger yarn; or

5—Increase your yardage 5 to 15%.

6—Save materially on oil and belts.

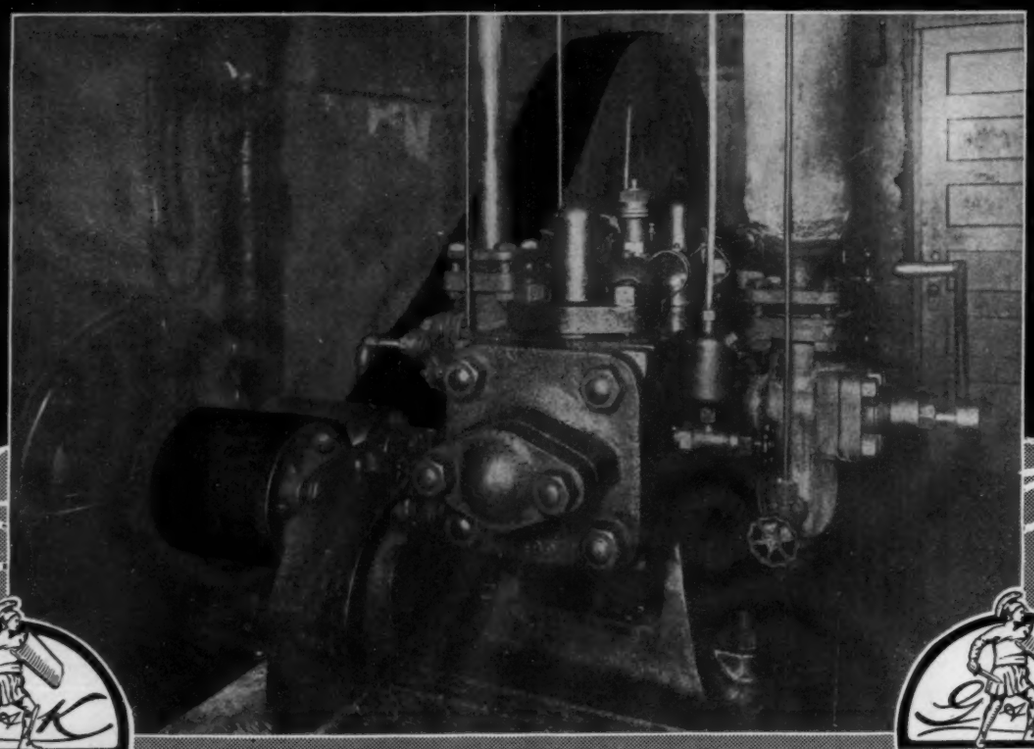
7—Greatly increase your dividends.

These are no mere claims. All are **facts** proved repeatedly by hard-headed mill superintendents the country over.

Do **you** want decreased power costs and at the same time increased production in your spinning room? Then merely write us: "Send me your new booklet—"Greater Efficiency in the Spinning Room."

Chapman Mfg. Co
BOSTON

SPARTAN



SPARTAN
TRADE MARK REG U.S. PAT OFF

SPARTAN
TRADE MARK REG U.S. PAT OFF

BELTING

Driving Gas Compressor at Hotel Planters, Chicago, Ill.

Driving pulley 11½ inch diameter, 610 R. P. M. Driven pulley 79 inch diameter, 8 inch Lenix Idler. 8 ft. between pulley centers. 85 H. P.

Chief Engineer, Klein, says:—

"The Spartan Belt that you furnished for our twenty-five ton gas compressor is as good as new. We have run same about eighteen months, about sixteen hours per day.

"The belts we used before we had yours put on run us about eight months,—yours is good for a number of years more."

It's the pliability of Spartan Belting and its power of resistance to unusual operating conditions that make it the compressor belt of unequalled success. These same qualities assure you the utmost service from Spartan Belting,—whether used on compressors or exposed to the steam, water, oil, acid fumes or other adverse conditions.

In short, Spartan is the belt for all difficult drives. Evidence of this is found in the new Spartan Book. It's a small book but it shows Spartan Belting operating under a great variety of conditions. You will be interested to receive a copy, and it's yours for the asking.

The Graton & Knight Mfg. Company

Oak Leather Tanners and Belt Makers

Worcester, Mass., U. S. A.

Branches in Principal Cities.

WHETHER used to transmit power from motor to lineshaft, or from motor to individual machine, Link-Belt Silent Chain shows an efficiency of over 98%.

LINK-BELT
SILENT CHAIN DRIVES

are run slack, the only pull being the power pull, which decreases as the load decreases. The speed of the shafting is sure, and the output, therefore, can be depended upon.

Individual machine drives have the added advantages of ease of application, convenience of arrangement of machines, positive transmission, smoothness of operation.

Let us tell you what other mill and factory owners have accomplished through the use of Link-Belt Silent Chain Drives.

We have applied them to every known type of machinery, and our experienced engineers are at your disposal to tell you how to use them.

Write for Data Book No. 125, our 112-page Price List

LINK-BELT COMPANY

PHILADELPHIA CHICAGO INDIANAPOLIS

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Pittsburgh . . 1501 Park Bldg.
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Buffalo . 698 Ellicott Square
Cleveland . 1304 Rockefeller Bldg.

Detroit . 732 Dime Bank Bldg.
Wilkes-Barre, 2nd Nat'l Bank Bldg.
Minneapolis . 418 So. Third St.
Los Angeles, 161 N. Los Angeles St.
Seattle . . 560 First Ave., S.
Portland, Ore., 14th & Lovejoy Sts.
Knoxville . . Empire Bldg.
Birmingham, D. T. Blakey, 909 Am. Trust Bldg.
Denver, Lindrooth, Shubart & Co., Boston Bldg.
San Francisco . 461 Market Street

New Orleans, Whitney Supply Co., 418 So. Peters St.
Charlotte, N. C., J. S. Cothran, Commercial Bank Bldg.
Louisville, F. Wehle, Starks Bldg.
Toronto, Canadian Link-Belt Co., Ltd.

PINNACLE RUBBER BELT

Operates as Well as Leather and Costs Less Than One-Half as Much. 80% of All Cotton Mill Drives Take It

Why Use PINNACLE?

Because it can be used on the majority of cotton mill drives at a cost of about 40% of the cost of leather. It fully equals leather in operating results.

Because when stretched and impregnated with the highest quality of rubber friction, it looses all the characteristics of fabric or duck while at the same time having the pliability not found in leather. It has a more aggressive grip.

Because it will give just the service you want when used for all main and countershaft drives, openers, breakers, cards, spoolers, warpers, slashers and heavy looms where friction drives are used.

Because PINNACLE—a two-thirds cotton belt—used by cotton mills everywhere would increase the production of cotton fabric by almost one million dollars annually. This surely would be to your individual advantage as you would save by buying and using PINNACLE Belt and make money on increased production of fabric. ***Write for samples today.***

THE B. F. GOODRICH COMPANY

Makers of the Celebrated Goodrich Automobile Tires—*"Best in the Long Run"*

Factories: AKRON, OHIO **Branches and Distributors in All Districts**

Coal Prices Going Up

The coal supply is becoming scarcer and scarcer. Prices will doubtless go higher.

The textile manufacturer who spends his good money for coal, when he can get his power much cheaper and with less trouble, must surely have money to burn.

Every textile mill in the country will eventually use electric power, and it's the wise manufacturer who adopts it now before he burns up more money in a boiler room.

The central station can supply electric power many times cheaper than it can be furnished by a steam plant. But perhaps the greatest advantage of electric power is the increased output per machine, the lower cost of unit production, and the flexibility and freedom to make extensions or alterations and to operate overtime at a proportionately lower cost.

The following is an excerpt from a letter from a manufacturer who is operating approximately 60,000 spindles and buying Central Station Power.

"With reference to the subject of purchased power and Electric Drive for cotton mills, wish to say that after a thorough investigation of our cost for operating condensing steam plant as compared to electric power, we are fully convinced that Central Station Power would be more economical.

"The installation of this Electric Drive has eliminated the main drive and a number of counter drives, and the consequent saving in belting and friction load.

"This power has been very satisfactory, giving us a uniform speed and increased production; the greatest advantage we have secured, however, is due to the fact we operate any department overtime, or run such machinery as desired in all departments at night without increasing the power cost per pound of production, which is not possible with steam power.

"This power is excellent, and there have been fewer interruptions and stoppages than with our steam plant."

Your better judgment tells you to change over to electric drive, and such an investment will pay dividends.

If your mill is situated on our power lines, we can supply electric power service that is always steady and satisfactory and will contract for a period of years at a fixed rate, and you will bother no more with the uncertainties of coal prices, and the additional expenses of boiler room operation.

If your mill is not situated on our lines, the City of Augusta has many advantages to offer you. The climate the year 'round is especially suited for the successful operation of manufacturing plants of this kind; there are many ideal factory sites on our lines; an unlimited supply of high class raw materials; seven railroads centering in Augusta; the Savannah River affords water transportation the year 'round, and freight rates on both facilities are extremely low, and the central location of Augusta is ideal for distribution to large local markets such as Atlanta, Macon, Savannah, Charleston, Charlotte, etc., with through service to all points.

Labor of a higher than average class is in abundance in Augusta. Men and women, girls and boys, who cannot now secure positions elsewhere in the city, would welcome the opportunity of a position in a textile mill.

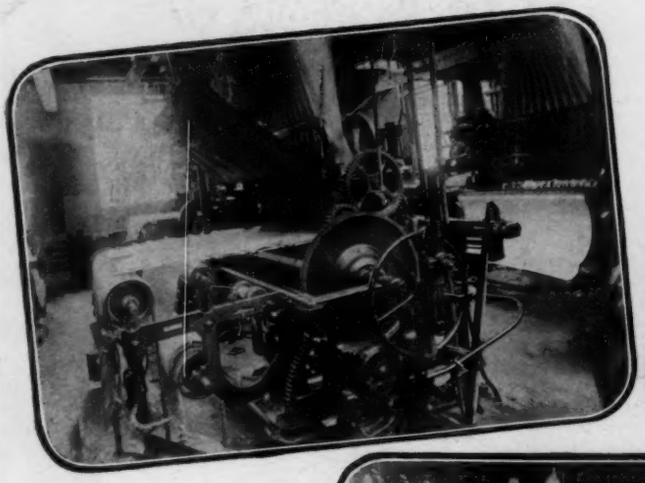
For further information address

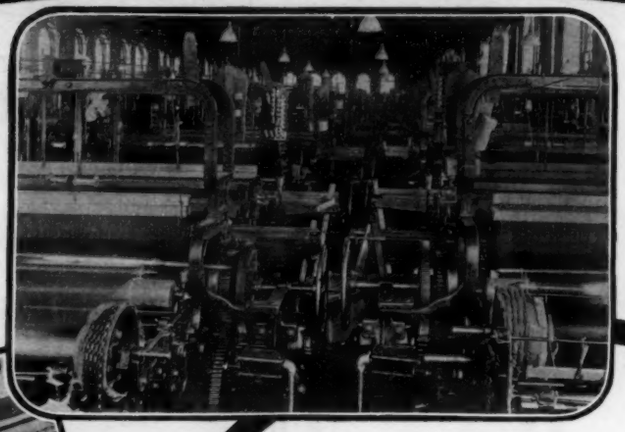
COMMERCIAL DEPARTMENT

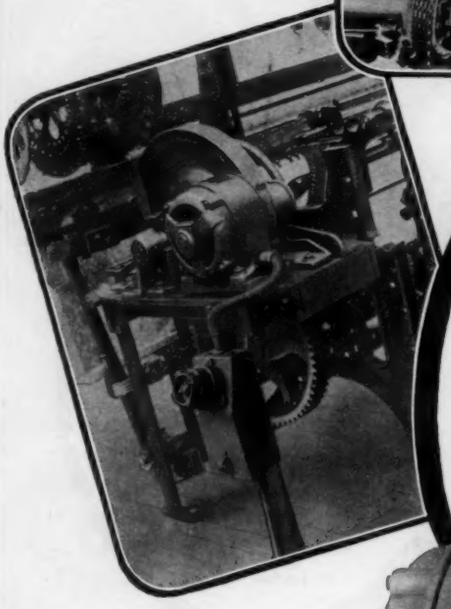
Augusta-Aiken Railway & Electric Corp.

Augusta, Georgia

Westinghouse





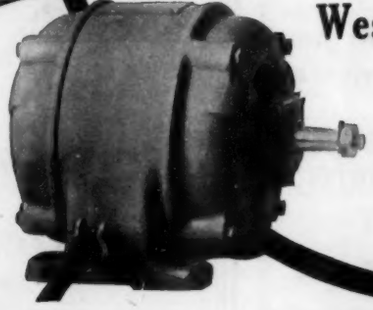


Westinghouse Loom Motors

are successfully driving looms in many of the country's largest mills.

These motors have torque characteristics adapted to the driven machine and are highly efficient.

Our textile experts are at your service.



Westinghouse Electric & Mfg. Company

East Pittsburgh, Pa.

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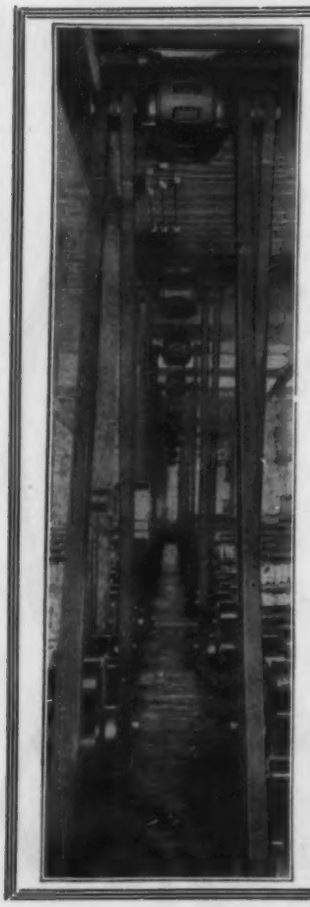
W WESTINGHOUSE ELECTRIC

Western Electric
ELECTRICAL SUPPLY
YEAR BOOK
1917
Another–
Western Electric
QUALITY PRODUCT
The catalog with one uniform set of list prices – and one basic discount on everything
Read what three users of electrical catalogs have to say about it–
Now Ready
We have finally decided to adopt your effective September 1st ..... hereafter we feel that we can rely upon it being kept up to date and our various offices being supplied as the new issues come out.
We are much pleased with it, especially because we find the listing of articles so much more simple than was the old style catalog which we had.
Your catalog seems to be unusually free from the technicalities of th which electrical supply catalogs usually disguise information from the customer.
Western Electric Company
INCORPORATED
195 BROADWAY, N. Y.
We have not received copy of the 1917 Year Book, please send it to us.
Western Electric Company
INCORPORATED
EQUIPMENT FOR EVERY ELECTRICAL NEED



Induction Motors

for all Textile Power Requirements

Individual Drive
Two Frame Drive
Four Frame Drive
Group Drive

Let Us Figure on Your Requirements

ALLIS-CHALMERS MANUFACTURING COMPANY

Milwaukee, - Wisconsin

The Heart of an
ECONOMY
renewable cartridge
FUSE

is the "Drop Out" Renewal Link. It is the only thing you have to replace in order to renew a blown ECONOMY FUSE. The expense is trifling, compared to the utter extravagance of discarding an entire fuse after it has operated.

Use Economy Fuses in your plant and by their use cut yearly fuse maintenance bills a full 80 per cent.

Write for free Samples. Test them. Let the results speak for the economy and safety of Economy Fuses. Be sure to ask for Catalog 39.

Economy Fuse & Mfg. Co.
Kinzie and Orleans Sts.,
CHICAGO.
At Leading Jobbers.

First—the best Natural light.

Second—the best artificial light.

The careful thought and expense that is put into new mill construction to secure natural light show that mill men are realizing that efficient illumination increases production, decreases the amount of waste and the number of "seconds," reduces accidents and is a good investment.

But natural light, however modern the mill construction, cannot be depended upon all the time. Atmospheric conditions make artificial light necessary and so does night work.

The first thought should be for good natural light. The second for good artificial light. No matter how old the mill, how small the windows, you can have efficient artificial light for night work and for daytime when the sun is not shining. Whatever the construction of your mill, whether old or new, you need a scientific installation of Westinghouse Mazda lamps. It is an investment that will show results at once.

The experience of our engineers is at your service to assist you without obligation on your part.

WESTINGHOUSE MAZDA

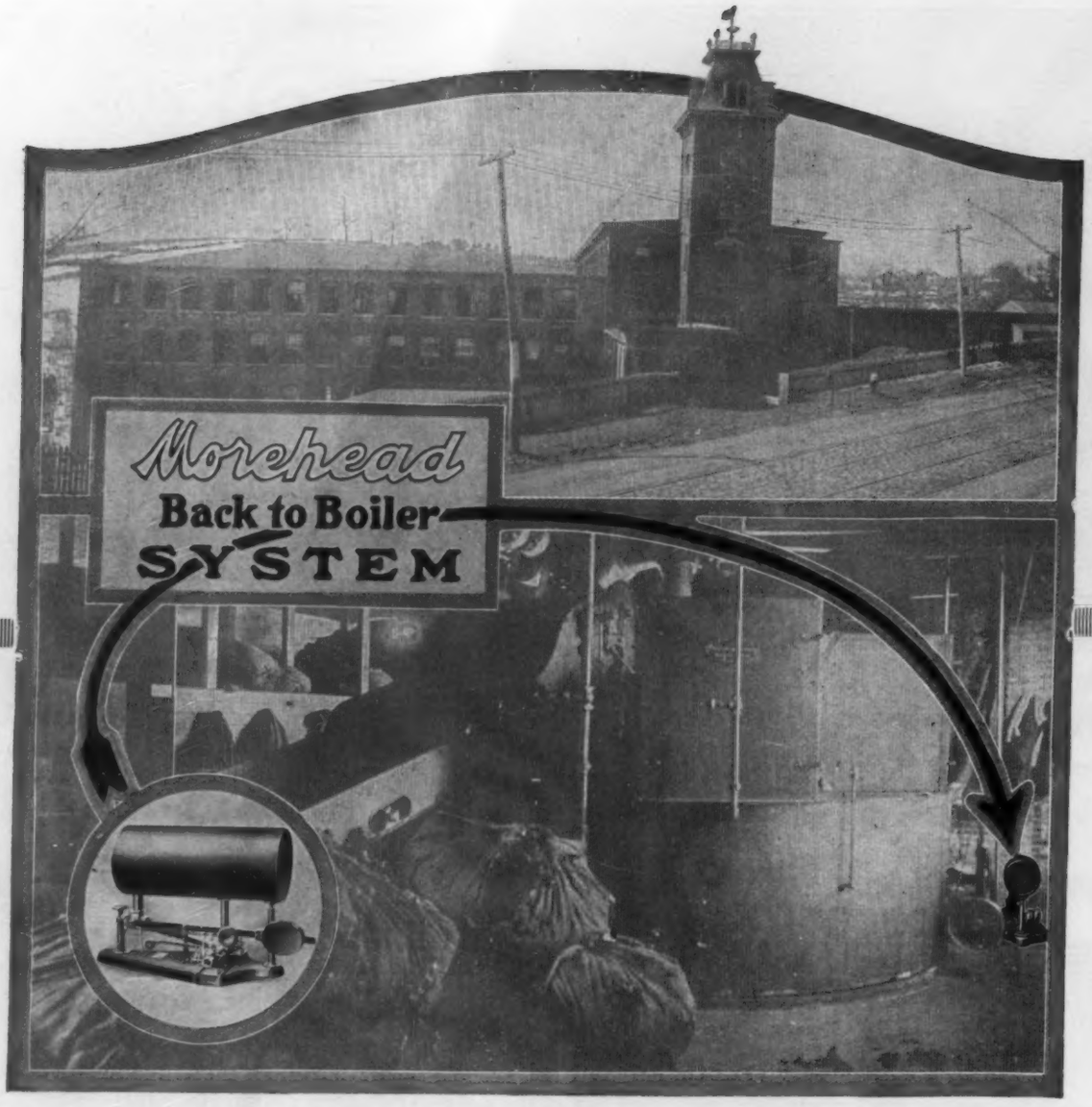
The Lamp for Industrial Lighting

Guaranteed by the name.

The Westinghouse Lamp Company

Atlanta	Cleveland	Kansas City	Pittsburgh	New York
Baltimore	*Dallas	Los Angeles	Portland	Salt Lake City
Boston	Denver	Milwaukee	St. Louis	San Francisco
Chicago	Detroit	Philadelphia	New Orleans	Seattle
Cincinnati				Syracuse

Export Sales Dept., 165 Broadway, N. Y. C. For Canada—Canadian Westinghouse Co., Ltd., Hamilton, Ont.



Sluggish Circulation in Textile Machinery Completely Cured

PIPING HOT steam coils insuring maximum efficiency in textile machinery operation positively follows every installation of the

Morehead
Back to Boiler
SYSTEM

It takes the water out of the steam coils in your dryers, carbonizers, presses, slashers, cans, calenders, combs, spreaders, soap tanks, dye vats, mill heating, etc., and returns every drop directly back (under pressure) to the boiler while it is HOT.

Not only will you increase the capacity of your machines, but you will save a large per cent of your fuel. Ask about the

MOREHEAD COIL SYSTEM FOR HEATING DYE VATS

Saves nearly 39% of the steam as compared to direct blow or high pressure steam. Effects a saving in Dyes and Chemicals for standing kettles, one dips, etc.

Get in touch with our Textile Dept. for complete information.

Morehead Manufacturing Co., Cotton Mill Department Detroit, Mich.

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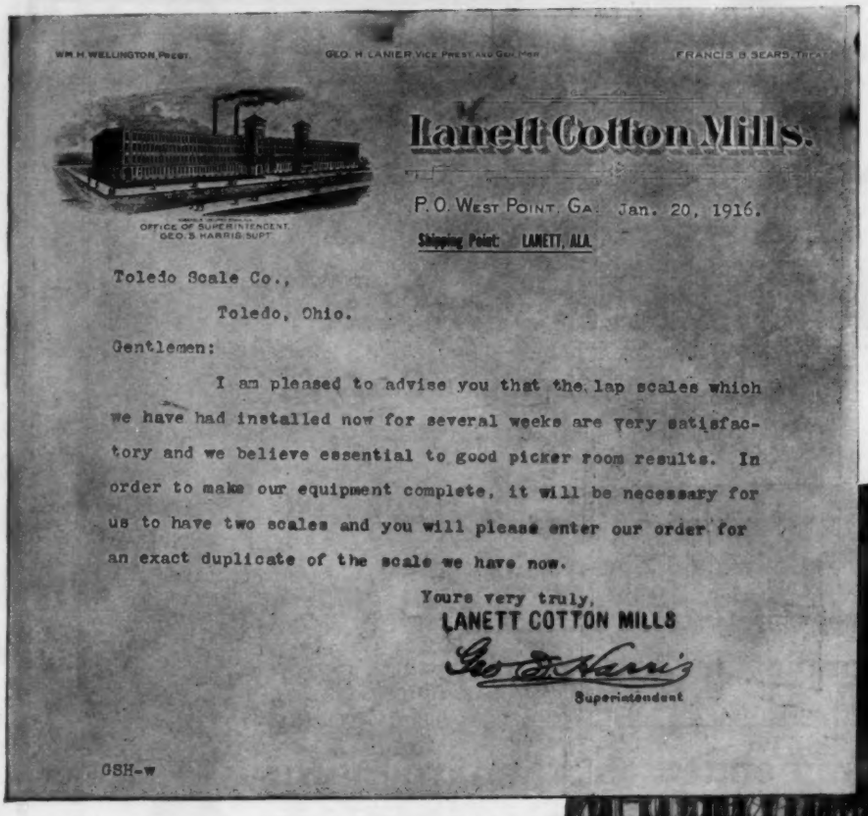


WM. H. WELLINGTON, PRES'T. GEO. H. LANIER, VICE PREST. AND GEN'L MGR. FRANCIS B. SEARS, TREAS.

OFFICE OF SUPERINTENDENT
GEO. S. HARRIS, SUPT.

Lanett Cotton Mills.

P. O. WEST POINT, GA. Jan. 20, 1916.

Shipping Point: LANETT, ALA.

Toledo Scale Co.,

Toledo, Ohio.

Gentlemen:

I am pleased to advise you that the lap scales which we have had installed now for several weeks are very satisfactory and we believe essential to good picker room results. In order to make our equipment complete, it will be necessary for us to have two scales and you will please enter our order for an exact duplicate of the scale we have now.

Yours very truly,
LANETT COTTON MILLS
Geo. S. Harris
Superintendent

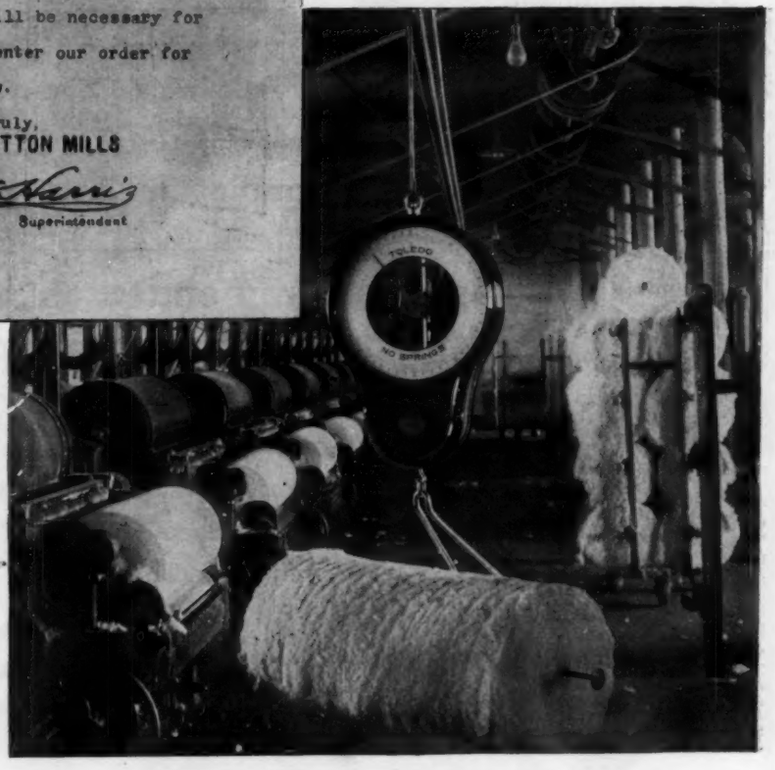
GSH-w

"Essential to good picker-room results"

—writes the Lanett Cotton Mills.

Read their letter. One man operates the Toledo Scale shown in the picture. As rapidly as each lap is turned out, its weight is speedily and accurately recorded.

This is only one of the many Southern mills who are enthusiastic users of Toledo Scales.



THE speediest, most accurate and economical method of weighing is being adopted by the progressive mills throughout the South. They realize the necessity of accurate weight, *at a glance.*

The time-wasting and inaccurate beam scale has been discarded, and they are installing

TOLEDO SCALES

which insure *absolutely accurate* weight—which save time, as one glance at the big, easily read dial tells it all instantly—reduce weighing costs, as four laps can be weighed on a Toledo in the same time one can be weighed on an old-style beam scale.

Toledo Scales have many features not found in other automatic scales.

They are now in use in such mills as the Amazon Cotton Mills, Franklin Mills, Poe Mfg. Co., American Spinning Mills, Union Bleaching & Finishing Co., and scores of other progressive mills. Some of these mills use Toledo Dormant Platform Scales, some use the Toledo Lap Scale, while others use both.

Investigate for yourself. Write us today for the interesting booklet, "How Toledo Scales Save Time and Money in Every Weighing Process." It will prove of value to you.

TOLEDO Dormant. Many styles, sizes of platform, and capacities.

TOLEDO SCALE CO., 3307 Monroe Street **TOLEDO, OHIO**

Canadian Factory—Windsor, Ontario.
Branch Offices and Service Stations in All Large Cities.

BASIC SLAG

PLUS

BIRMINGHAM SLAG CO. SERVICE

Gives Greater Satisfaction, Minimizes Cost and

INSURES

SAFETY FIRST, LAST AND ALL THE TIME

To any Reinforced Concrete Structure

Safety from Collapse, Safety from Fire and Safety from the Corroding Influence of Time

---

Slag is recommended as Standard by the AMERICAN CONCRETE INSTITUTE

(See 1916 Proceedings of the Society, Volume XII, pages 173-176, 344-345.)

Also by the Engineering Departments of foreign governments, and by architectural and engineering authorities of the United States. The air cooled basic blast furnace slag which we MINE, CRUSH AND SCREEN for reinforced concrete structural work comes well within the requirements of the rigid specilcations of the American Concrete Institute.

We make free deliveries with our own locomotives over our own rails to ten (10) railroads entering the Birmingham District. You might be surprised to learn to what extent Slag has been used in this country as coarse aggregate in concrete, as a road metal in various types of pavement and as a roofing material in built-up roofs. If interested we will mail you a list of

OVER 100 OF THE MOST IMPORTANT REINFORCED SLAG CONCRETE STRUCTURES

In Birmingham, Atlanta, Macon and other Alabama and Georgia cities. In Chicago, Ill., Cleveland, Ohio, Pittsburgh and Philadelphia, Pa., and many other middle western and Eastern cities. It is to your interest to investigate and our pleasure to prove the truth of every claim we make for Slag.

Ask us how, and ask us now!

BIRMINGHAM SLAG COMPANY

Home Office:
1607-16 Jeff. Co. Bk. Bldg.,
Birmingham, Ala.

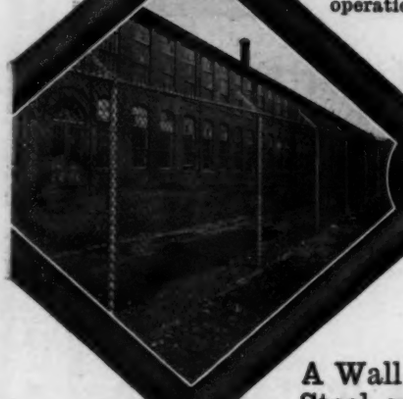
Branch Office:
716-717 Empire Bldg.,
Atlanta, Ga.

Sales Representatives:
Savannah, Ga. .....M. Thomson
Macon, Ga. .....D. W. Hill & Co.
Thomasville, Ga., The Standard Sales Co.
Albany, Ga. .....W. A. Stokes
Waycross, Ga., Whitman Commission Co.

OK'D BY FACTORY OWNERS

Manufacturers are quick to recognize and take advantage of improvements which bring assurance of increased security for their property and greater efficiency in its operation.

Many of the large factory properties, in all parts of the United States, are now protected by CYCLONE CHAIN-LINK WOVEN STEEL Property Protection FENCE



A Wall of Woven Steel which can not be pulled down, broken through or climbed over.

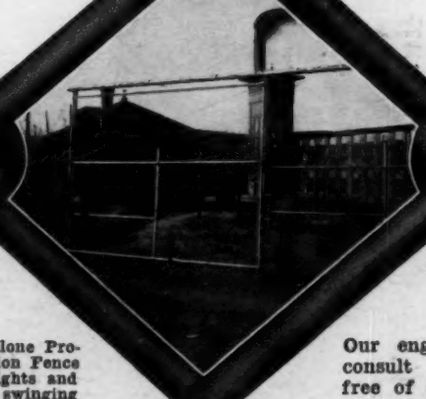
Fire Proof, Weather Proof, Thief Proof, Economical, Permanent, Saves Annual Repair Expense.

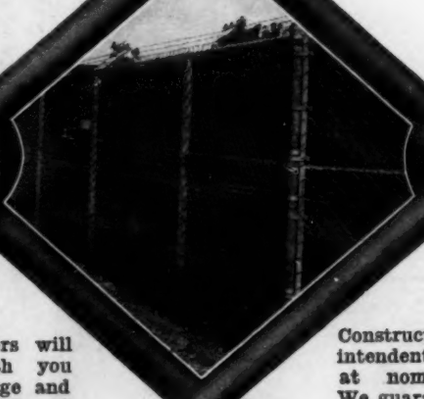
Fabric of large, high grade, heavily galvanized wire. Method of weaving forms a double brace in each mesh, of great strength and shock-resisting resiliency.

Small mesh leaves no toe hold for would-be climbers. Barb wire top overhanging either side or both sides prevents climbing over.

Posts of heavy tubular steel represent maximum strength in fence construction.

NO WEAK SIDE.





We build Cyclone Property Protection Fence in various heights and styles, with swinging or sliding gates for alleys, switch tracks, driveways, etc.

Our engineers will consult with you free of charge and suggest a system of protection that will meet your particular need.

Construction superintendent supplied at nominal cost. We guarantee every fence we erect. Illustrated catalog on request.

CYCLONE FENCE COMPANY Dept. 134 WAUKEGAN, ILL.

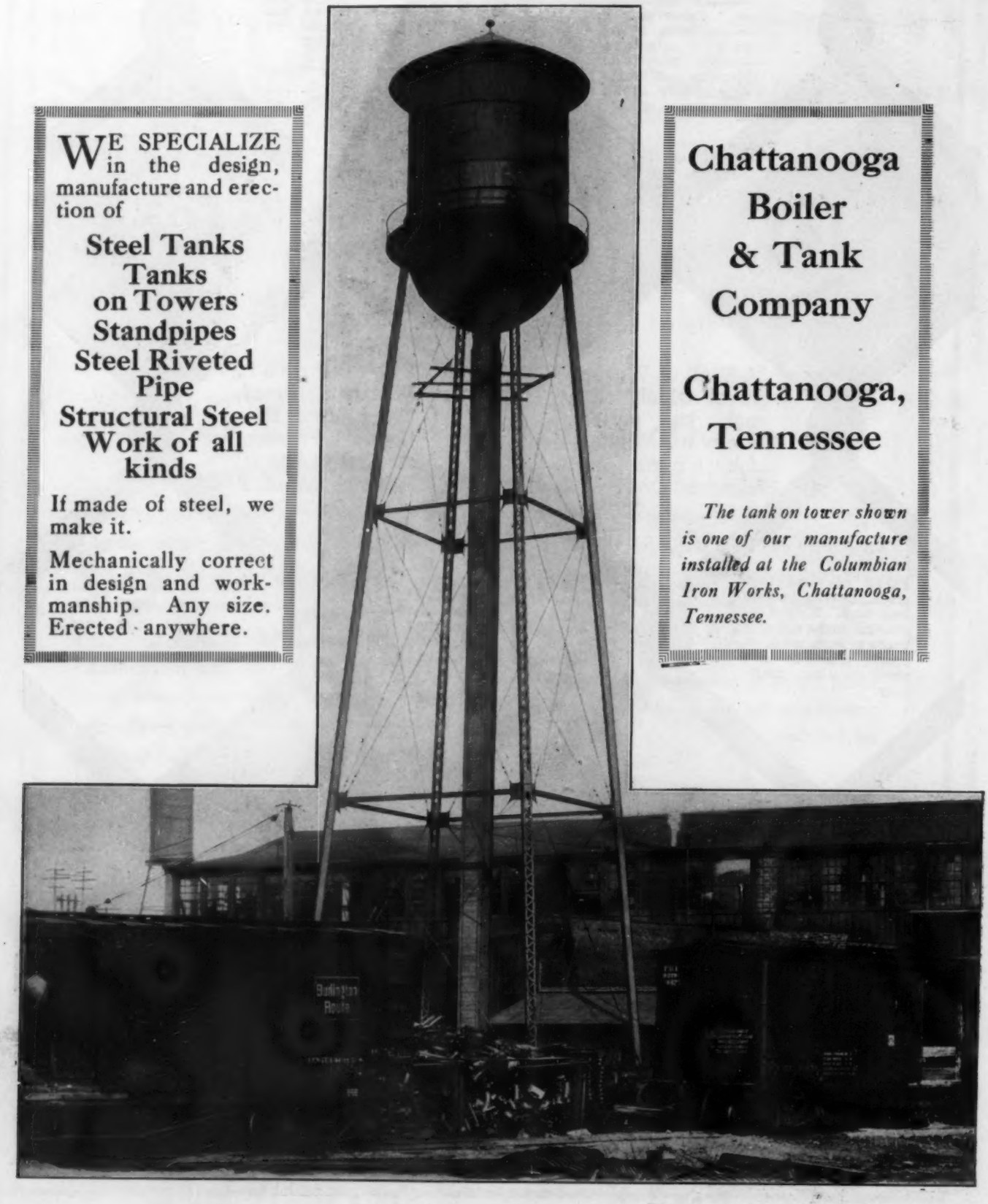
Steel Tank Specialists

WE SPECIALIZE in the design, manufacture and erection of

Steel Tanks
Tanks on Towers
Standpipes
Steel Riveted Pipe
Structural Steel Work of all kinds

If made of steel, we make it.

Mechanically correct in design and workmanship. Any size. Erected anywhere.



Chattanooga Boiler & Tank Company

Chattanooga, Tennessee

The tank on tower shown is one of our manufacture installed at the Columbian Iron Works, Chattanooga, Tennessee.

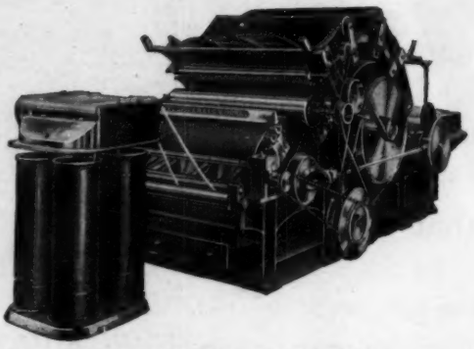
SACO-LOWELL SHOPS

TEXTILE MACHINERY

INCLUDING

SPECIAL EQUIPMENT FOR THE MANUFACTURE OF WASTE INTO YARNS & CLOTH

IMPROVED METHODS
AND
MACHINERY
FOR
HANDLING
COTTON WASTE
SIMPLE EFFICIENT



Four Coiler Waste Finisher Card.

DOUBLE CARDING
WITH
LAP-WINDER
AND
FOUR COILER
FINISHER CARDS
COMPLETE SYSTEMS

SHOPS

BIDDEFORD, ME. LOWELL, MASS. NEWTON UPPER FALLS, MASS.

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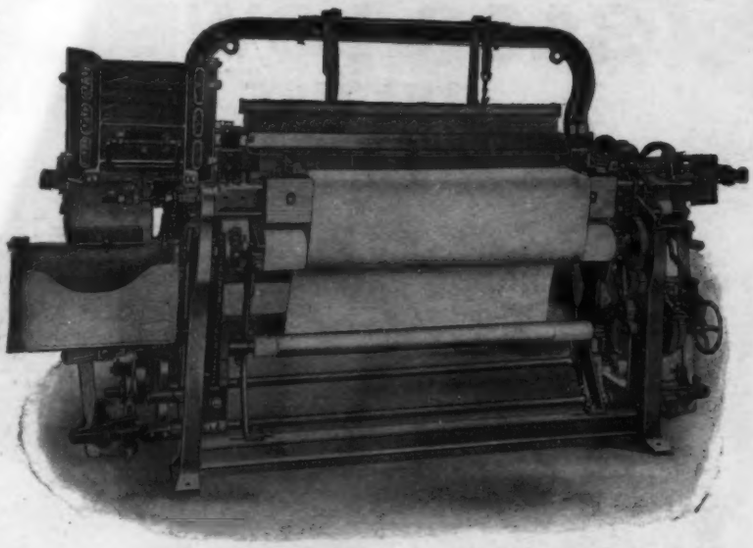
LOOMS

WORCESTER, MASS.

PROVIDENCE, R. I. PHILADELPHIA, PA.

Alexander & Garsed, Charlotte, N. C., Southern Representatives.

THE "IDEAL" Automatic Loom stands for low operating cost and high quality of fabrics.



It has the widest scope of any automatic loom and can be easily changed over from one fabric to another.

And remember that while saving 50% to 60% in weaving costs for you the weavers can earn from 40% to 50% more wages.

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Readville, Mass.

Fred H. White, Southern Agent, Charlotte, N. C.

42 YEARS EXPERIENCE

1873 1915

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Spinning Rings
Twister Rings
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Guide Wire Sets

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WHITINSVILLE, MASS.

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The only firm in the world exclusively devoted to building and improving grinding machinery for textile mills.

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System: G. Josephy's Erben

Asbestos and Flax Machinery a Specialty

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Schofield Patent Automatic Opener and Duster.

For opening and dusting Wool, Cotton, Linters, Hair and kindred fibrous substances.

"Schofield" intermediate feeds for Cards, Wool, Rag, Waste, Hair and Lumper Pickers, Automatic, Cone and Oldham Willows, Rag and Extract Dusters, Waste Pullers, Blamaine Lap Feeds, Curled Hair Pickers, Needle Looms, etc.

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Iron Founders, Textile Machinery Builders.

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The Palmer Adjustable Thread Guide

For Ring Spinning and Twisting Frames

Easily adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

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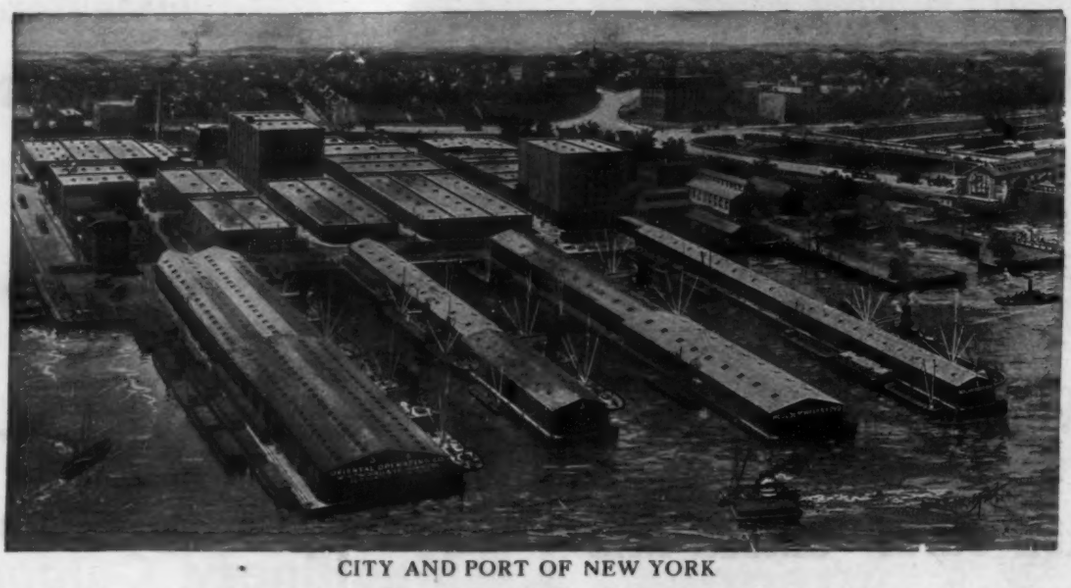
350,000 — BALES

HANDLED DURING SEASON OF 1915-16 AT AMERICAN DOCK TERMINAL



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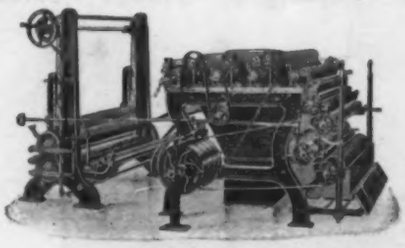
Lowest insurance and storage rates in the City and Port of New York obtained in modern concrete warehouses Fully protected by Automatic Sprinklers. New York Cotton Exchange license. Bonded employees. Forty years' experience in Cotton Storage Business. Direct rail connection with all Trunk Lines. Illustrated booklet and rates on application to AMERICAN DOCK COMPANY.

Executive Office: 17 State Street, New York

"If you are not a patron of the American Dock Terminal, you should be."



COTTON BRUSHING MACHINE
With Calender Rolling Machine

Cloth Room Machinery

For all varieties of cotton fabrics

Machines for Inspecting, Trimming, Sewing, Brushing, Shearing, Singeing, Measuring, Folding, Doubling, Rolling, Winding, Trade-marking, etc., etc.

Curtis & Marble Machine Co.

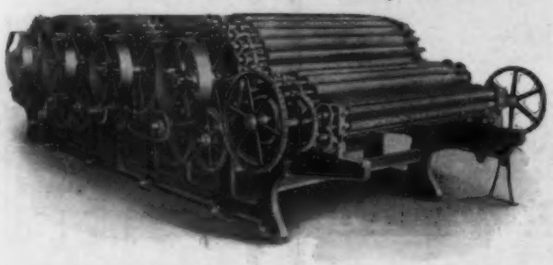
WORCESTER, MASS.

Also successors to Joseph J. Schofield, of Providence, R. I.

SMITH & FURBUSH MACHINE CO.

PHILADELPHIA, PA.

A Garnett Machine of this size will reduce to fibre hard twisted thread waste without materially shortening the staple.



4 Cylinder 30-inch Garnett Machine.

We also build smaller machines for working softer wastes. Send us a small sample of your stock and ask for Circular S-85.

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Leatheroid
MILL RECEPTACLES

Deserve preference because of superior durability.
Any Textile Mill Supply House in the South can supply these receptacles in any size or quantity.

Roving Cans, Trucks, Doffing Cars, Mill Boxes, Barrels, Baskets, Etc.

Sold by the Leading Textile Supply Houses of the South.

Leatheroid Sales Co.

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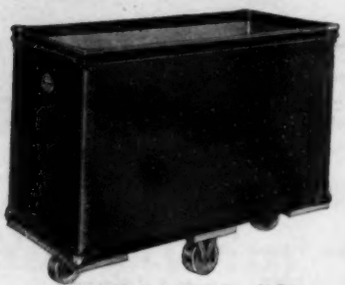
Selling Agents for the Leatheroid Co.

"Leatheroid" No. 1 Seamless Roving Can. Patented "Leatheroid" rolled top, rolled in and under two and one-half times, having no steel rim underneath the roll to break the can. Solid steel bottom, steel chime, 6 in. kicking band.



"Leatheroid" Steel Clad No. 2 Car.
Regular Sizes:
32 x 18 x 18 — 42 x 24 x 28
36 x 24 x 24 — 48 x 30 x 30

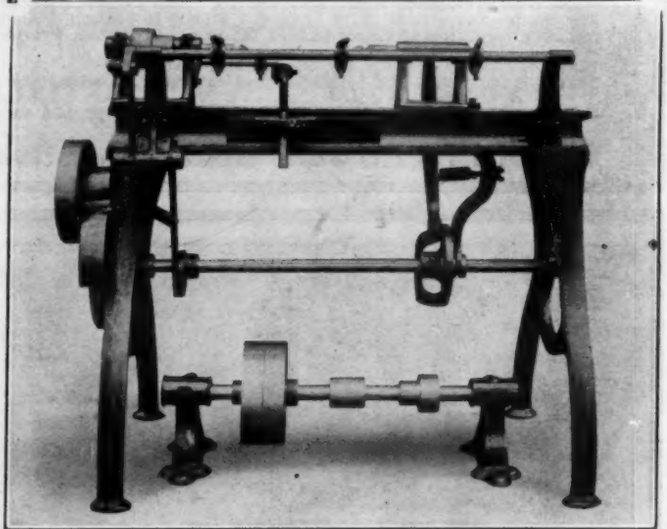
PAINT YOUR OWN BOBBINS
Two Big Reasons

1. An occasional coat of paint or shellac on your bobbins and spools is an investment that will pay good returns. These small but important parts are often overlooked, with the result that time and material are wasted and extra motions are required of operatives to keep up ends on rough and splintered bobbins.

But do your own painting. Don't pay out your good money to the bobbin manufacturers for painting or repainting. Many mills are buying their bobbins and spools unpainted, and saving at least 75% by doing their own painting.

2. Many mills are adopting the color plan for identifying different grades or sizes of yarn or warp, or for distinguishing carded and combed yarn, by using bobbins and spools painted different colors. One mill paints the ends of the bobbins, with the result that if a mistake is made in selecting the wrong bobbin, it would be brought to the attention of the operative or overseer as soon as it was put on the machine.

This plan has many other advantages, but it's too expensive to have the bobbins and spools painted outside or by the bobbin manufacturers.



The J. E. Lock
Bobbin Painting Machine

is a paying investment for any mill. Any class of bobbins or spools, quills, twisters, triptods, etc., can be painted on this machine at a speed of 30 per minute, all of them painted exactly uniformly and with no waste of paint. The cost of operation and supplies allows a big saving over the prices charged for painting by the bobbin manufacturers. Any boy or girl can operate it.

This machine is used by all the big bobbin manufacturers. It pays them, and it will pay you. It is now being used in the largest cotton, woolen and silk mills in the country. More and more mill men are realizing its advantages in their mill.

It will pay you to look into this painting proposition, and full information and prices will be sent you gladly. Drop us a line today.

We carry a complete line of Bobbins and Skewers. When in the market let us quote you.

BLANDIN COMPANY

Lawrence, Mass.

Southern Agent, F. B. CHADWICK, Charlotte, N. C.

Hercules
TRADE-MARK REGISTERED

Combination Doffing Cars

One stationary and one loose fibre box.
Substantial wood platform.
Self-oiling wheels.
Boxes may be steel clad if desired.

Vulcanized Fibre
Roving Cans, Boxes, Trucks, Barrels, Baskets, etc.

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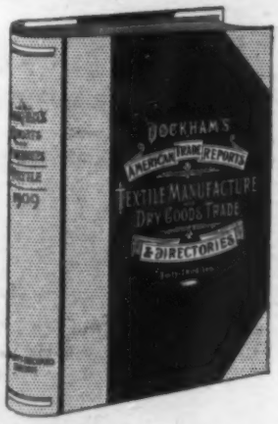
Kennett Square, Pa.

"The Standard"

ESTABLISHED 1866.



Honorable Mention, Paris Exposition, 1900
Gold Medal, Lewis and Clark Centennial 1905

JUST ISSUED

50th (Golden) Anniversary Number

25th EDITION

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United States and Canada.

All the New Mills Over 20,000 Changes Do You Know Them All?

If You Want the Most COMPLETE, ACCURATE and RELIABLE Textile Report and Directory You Need this New Book. Not only the Oldest, but, as always, the Biggest and Best. THE BOOK THE TEXTILE MILLS USE.

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Bleacheries, Print Works, Dyers and Finishers. Mercerizers.
Converters of Cotton Goods.
Yarn Dealers—Commission, Importers, Brokers, etc.
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" " —Liverpool, England; Bremen, Germany; Havre, France.
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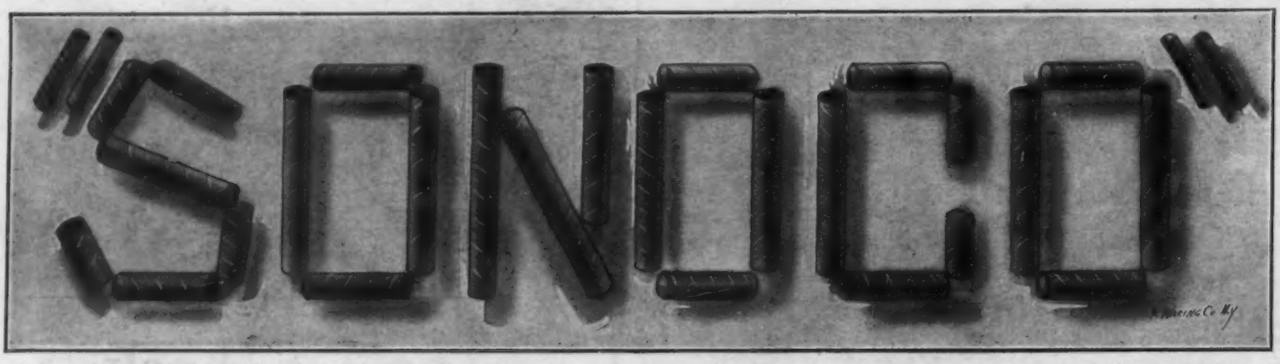
Waste Dealers—Cotton, Wool.
Dry Goods—Commission, Mfrs'. Agents. Wholesale Jobbers, Importers, etc.
Agencies and Offices of Manufacturing Companies in Boston, Providence, New York and Philadelphia.
Directors of many of the leading incorporated companies.
Textile Associations—Also interesting and valuable data relating to the great industry represented.
Full detailed report of all the mills. Book sent express prepaid on receipt of price, Six ($6) dollars.

SPECIAL ADDITIONAL CONTENTS

This Anniversary Number contains a reprint of all Textile Mills fifty (50) years ago, as printed in our 1st Edition; EXPORTERS of Textiles, Dry Goods, Etc.; also extra Statistical Tables, making it more than ever, the book for the Textile Mill, Office and Library.

DOCKHAM PUBLISHING CO., 6 Beacon St., BOSTON, MASS., U. S. A.



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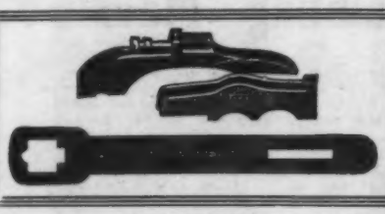

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SOLE MANUFACTURERS OF

Dixon Patent Locking and Stirrup Adjusting Saddles and Stirrups

The weight can be taken off and put on to the middle rolls, without stopping your frames, when long stapled cotton is used. The stirrup is always in place. No bent stirrup resting on rolls. Manufacturers of all kinds of saddles, stirrups and levers. Send for samples and prices. Spinners' Supplies in General.

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Sole Agents in the United States and Canada for Platto Bros. & Co., Cotton Machinery.
COMPLETE MILL EQUIPMENT
Patent Barchant Machinery for Making Yarn from Cotton Waste, Etc.

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ALL STEEL ECONOMY FIRE PROOF

FOR ALL PURPOSES
Largest Line in the U. S.
Write
ECONOMY BALER COMPANY,
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Necessaries for the Mill and Shipping Department.

CARY'S EVERLASTING FLEXIBLE STEEL MAT

Has a Scraping Surface in Every Direction.
Practically Indestructible.

The U. S. Government has contracted for this Mat to be used in all its buildings throughout the U. S.

TWELVE REGULAR STOCK SIZES.
SPECIAL SIZES TO ORDER

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THOSE WHO HAVE TRIED THEM SAY THEY ARE THE BEST

THE ABOVE SHOWS A BALE OF COTTON SECURELY FASTENED BY OUR BALE TIES AND BUCKLES
NOTE ITS NEAT AND COMPACT APPEARANCE

The Buckle can be applied with the Locking or Hook part next to the Bale, so that there is no possibility of its getting caught in other Bales when piled together.

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TWISTED AND FLAT WIRE BOX STRAPS and a FULL LINE OF SHIPPERS' SPECIALTIES.

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Our new Self-Tightening Twisted Wire Strap. Nails can be driven anywhere.

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The BRADLEY STENCIL MACHINE
Makes Stencils in half a minute, at reduced cost of 1-10c each
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Bradley Ball Stencil Pot uses Liquid Ink for marking and stenciling. Price 30c or $3.00 per doz. Manufacturers of Oil Stencil Papers.

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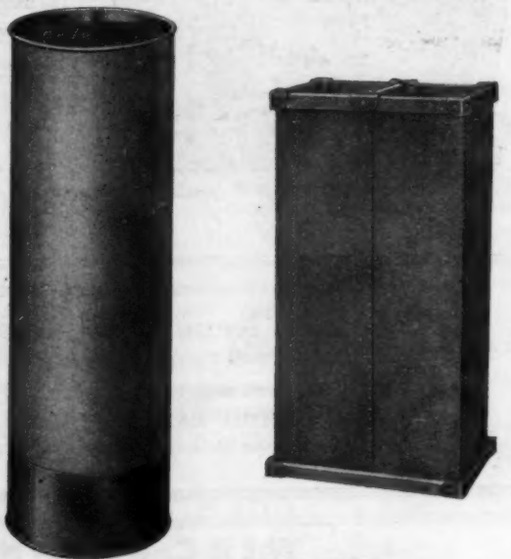

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for
COTTON, WOOL, SILK AND JUTE MILLS
Write for Catalogue D.

You Can Save Time and Prevent Costly Inaccuracies In Counting Fabrics and Mountings with a

NATIONAL COUNTING MACHINE

THIS METHOD of quicker, more accurate counting has been adopted by many of the largest manufacturers of textile lines like the following:—cloth bags, curtains, handkerchiefs, tablecloths, silks and velvets, webs and buckles, knitted underwear, hosiery, cottons, threads and worsteds, tents, elastic goods of various kinds, and many others.

There are sound money saving reasons for the adoption of the National Counting Machine—the best proof of which is that so many textile manufacturers have put them to work. These machines are made in 29 types and sizes to suit every requirement.

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Made from pure vulcanized fibre. Top moulding of hard wood, either plain or metal covered. Center bands and bottom mouldings of first quality maple. Self-oiling yoke wheels.

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Best Grade Renewed Lamps

Both Carbon and Tungsten Types

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FOR COTTON SHIPPERS, COTTON MILLS, MERCHANTS & MANUFACTURERS - ALSO BRUSHES, INK, MARKING POTS

RUBBER STAMPS, NOTARIAL & CORPORATION SEALS

ATLANTA RUBBER STAMP & STENCIL WORKS

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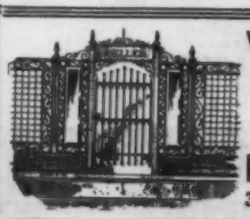
P.O. BOX 834 OLDEST STENCIL AND STAMP HOUSE IN GEORGIA ATLANTA, GA.

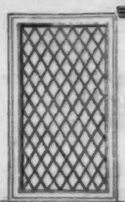


WIRE RAILINGS WINDOW GUARDS WIRE CLOTH.

Established 1835.

DUFUR & CO.

309 N. Howard St., Baltimore, Md.



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But, the cheapest fire insurance is insurance against fire. An ounce of prevention is worth a pound of cure any time. If a fire starts in your mill, are you prepared to stop it before it gains headway? If not, then the cheapest and most efficient protection is with the aid of

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They pay for themselves by reducing the cost of fire insurance.

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Ask us today to send you prices of an installation of Acmes in your mill.

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PRICE $15.00 PER M.

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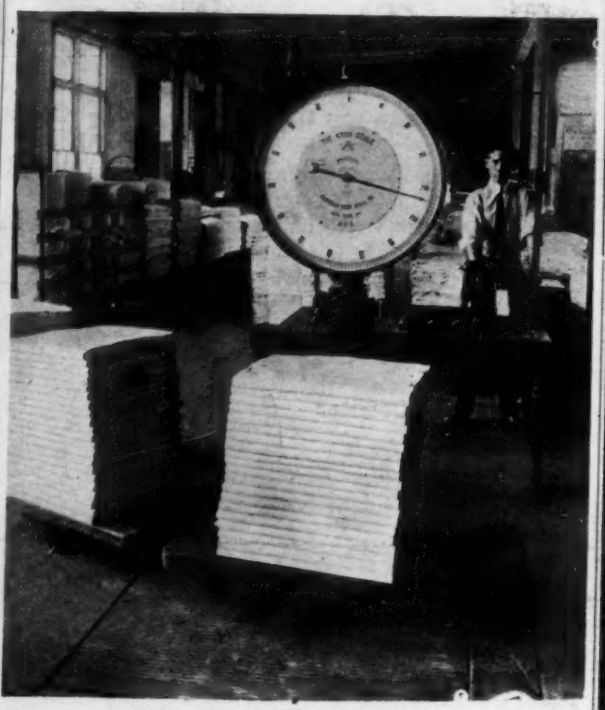

This picture shows the Kron Scale at work in the Exposition Cotton Mills, of Atlanta, Ga., one of the largest manufacturers of Sheeting, Shirtings, Drillings, etc., in the country.

"Load and Look"

Kron Scales

AUTOMATIC **SPRINGLESS**

All Metal Construction

The Kron performs automatically the whole weighing operation, weighing the material as fast as it can be handled. There's no chance for guessing—no false motions—no time wasted.

Kron Scales are proving a great time and labor saver in hundreds of textile mills and industrial plants of every description and are saving thousands of dollars yearly to the users.

100% efficiency in your weighing assured when you use Kron Scales.

Write for catalog and complete information.

American Kron Scale Co.

422 East 53rd St., New York.

CHICAGO—58 East 11th Street
PHILADELPHIA—506 Franklin Bank Bldg.
PITTSBURGH—Business Men's Exchange
CLEVELAND—610 Union Bldg.
BOSTON—141 Milk Street.
PROVIDENCE—125 Washington St.
SAN FRANCISCO—156 Fourth St.
DETROIT—521 Free Press Bldg.
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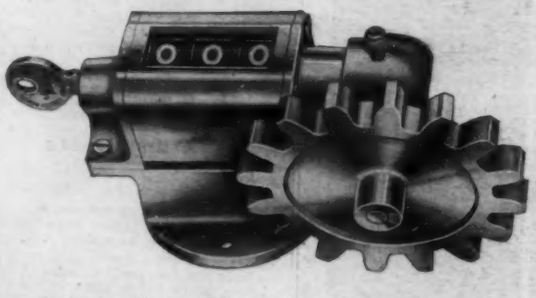
Loom Pick Counter

Loom Yardage Counter.



Our free textile booklet gives much interesting information. Yours for the asking.

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Lineal Measuring Counters

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Hank Counters
Thread Measuring Counters

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Is your office just a plain "cotton factory" office with worn-out furniture and inefficient filing systems, etc.?

Or is it a modern "Textile Mill" office, with up-to-date office furniture and "easy of access" filing systems—an office that has a brisk, business-like look to it?

Let us make your office up-to-date. We carry everything for the mill office,—desks, chairs, tables, Globe-Wernicke filing cabinets,—everything that is used in an office.

Our prices are right—our service is prompt.

Baylis Office Equipment Company

ATLANTA, GA.

Do you desire your employees to breathe Pure Air?

DUPLEX CONE FANS

have been designed to produce any pressure required in any plenum or exhaust system, the disc fan not being effective in many such installations.

Duplex Cone Fans are preferable to the commonly used centrifugal or enclosed blower fans, because of the small space required, and also the small initial and power maintenance cost.

Want Particulars? Ask them of

HOWARD & MORSE
45 Fulton St., New York

PERFORATED METALS

FOR ALL PURPOSES

Such as Cotton Seed Oil Mills, Cotton Gins, Phosphate Screens, Coal Screens, Ventilation, Electrical Devices, Sugar Mills, Surfacing for Sand Rolls.

Send for Metal Sample Plate and Circular.

ERDLE PERFORATING CO.

167 YORK ST., ROCHESTER, N. Y.

THE HALL TRUCK 2-3½-5 TON

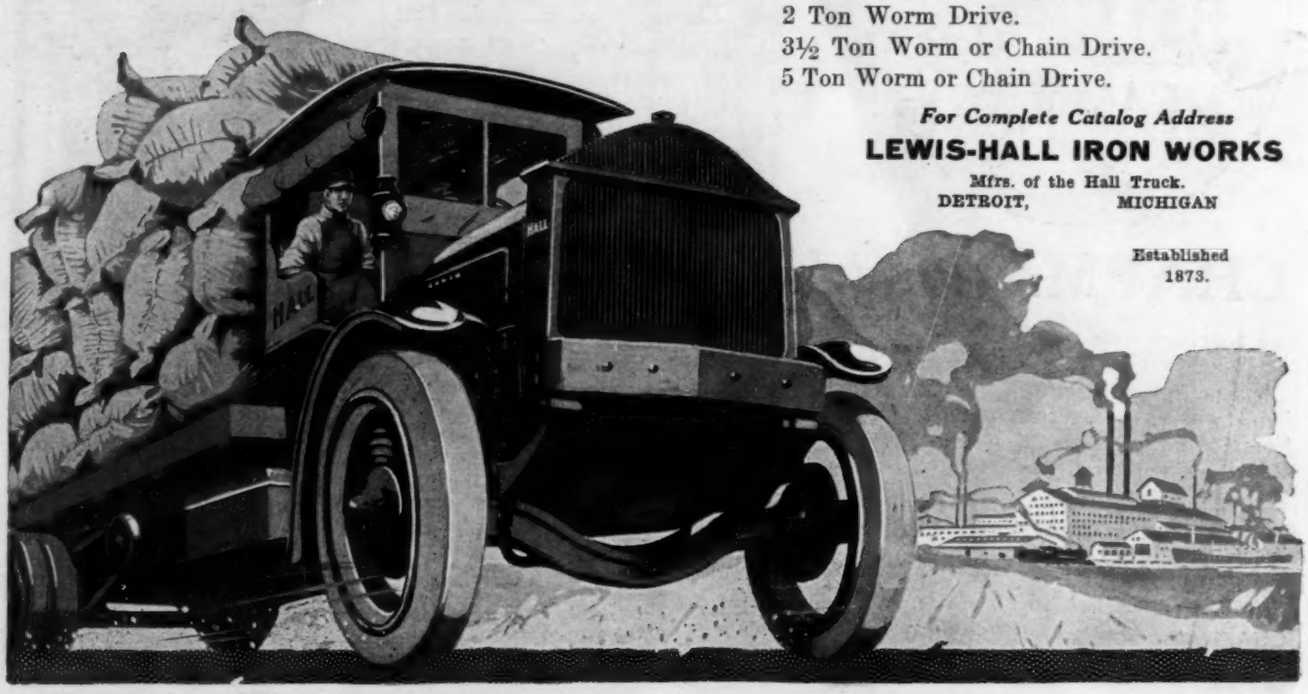
A BIG POWERFUL TRUCK

for your heavy duty haulage—equipped with standard units throughout: Continental Motor, Timken Axles, Brown-Lipe Transmission.

2 Ton Worm Drive.

3½ Ton Worm or Chain Drive.

5 Ton Worm or Chain Drive.



For Complete Catalog Address

LEWIS-HALL IRON WORKS

Mfrs. of the Hall Truck.
DETROIT, MICHIGAN

Established 1873.

ROOT COUNTERS

Stop

Loss from Overruns, prevent waste, errors and disputes—by counting automatically.

HAND COUNTING is inaccurate. The dead monotony of it tires the best workers and ends in errors. Guess work is worse.

Can you afford either when you can count automatically and instantaneously with this simple and inexpensive counter?

Can you afford the time lost because of short count or the material wasted by generous over-allowance? By means of Root Counters you can get accurate cost record of operatives or machines.

They are adapted for every textile use whether you want to count the output of looms, twisters, folders, tenter frames, slashers, etc., to count stockings, sweaters, or other knit goods; or to measure cloth, ribbons, velvet, or the like.

Root Counters are small, springless, easy and positive in action and fundamentally accurate at all times.

Why not select and send for the type which fulfills your requirements today? Remember—you try it for 30 days in actual service without cost or obligation. Write for catalog.

The C. J. Root Company, 200 Johnson St., Bristol, Conn.

CHAPMAN BALL BEARINGS

Saving Profits

"During the next ten years some of the largest profits in American Industry will be saved out of operation. Heretofore profits have been made, but saving a profit is altogether different."

CHAPMAN BALL BEARINGS

the bearings with the double row of balls—begin the saving at the very source of loss. They can save every ounce of that power that is wasted now in overcoming the frictional resistance of those plain bearings on your lineshafts. That waste, eating into your profits, amounts to more than you may think. Some of your profits from these days of prosperity, invested in Chapman Ball Bearings, will help you pay dividends in days of keener competition.

TRANSMISSION BALL BEARING COMPANY, Inc.

1050 Military Road, BUFFALO, N. Y.

New York: Room 101, 30 Church St. *Branch Offices* **Philadelphia: Bourse Building**

CHAPMAN DOUBLE BALL BEARING CO., Ltd., 339-351 Sorauren Ave., TORONTO, ONT.

Investigate—Send for our book on Bearings.

Hubbard Beater Box Disassembled, showing S. K. F. Ball Bearing.

An Important Test at the Lowell Textile School.

A test was made at the Lowell Textile School, Lowell, Mass., to obtain the comparative power requirements of a shoddy picker equipped with plain bearings and then with Ball Bearings. The plain bearings used were in first-class condition, and this fact should be kept in mind in any comparisons made involving these results. The power records were obtained by a recording watt meter and the feed was kept uniform by using a constant weight of stock per lineal foot of the feed apron. The result was as follows:

Rate of Feed	Plain Bearings Horse Power	Ball Bearings Horse Power	Per Cent Saving
75 lbs. per hr.	6.01	5.19	13.6
100 lbs. per hr.	7.05	5.68	18.8

Unless the Beater Shaft and Fan Shaft of all your Cotton Pickers, Cotton Breakers, Intermediate Lappers and Finisher Lappers are equipped with

HUBBARD BALL BEARING BOXES

you are wasting power.

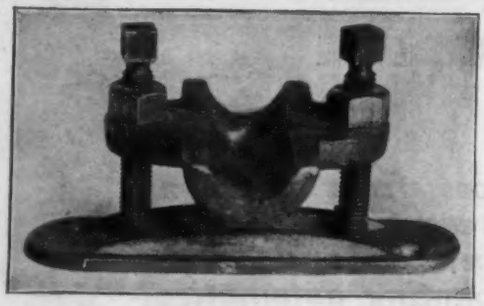
They are made to replace old plain type journals without machine work at the mill. The change over to ball bearing boxes is completed easily and many mills are "modernizing" their machines by applying these efficient bearings.

Write today for interesting bulletin.

FRED H. WHITE, Southern Agent, Charlotte, N. C.

HUBBARD MACHINE CO. Worcester, Mass.

DAY Adjustable Rocker Shaft Bearings



No. 1 A. Patented Oct. 26, 1915.

THIS is just a common sense attachment that has not failed to satisfy a single mill.

Your rocker-shaft troubles will be over when you equip your looms with Day Adjustable Bearings. They will save you the cost of a new rocker shaft for all time, reduce seconds and thin places, save in supplies, break-outs, and in many other ways.

As one Georgia mill superintendent wrote us,

"Any practical mill man who will test these bearings, will find at least twenty different ways in which they will keep the loom in better shape and increase production. I would advise any mill man to try these bearings and be convinced of the merit of it, like I have been."

This man equipped his 1820 looms with Day Adjustable Bearings.

Any of the many mills using them will tell you about their many advantages.

Let us send you a pair for trial. State kind of loom. Write today.

Textile Specialty Company

(Formerly Day Adjustable Bearing Company)

GREENWOOD, S. C.

SAVE RESPLICING COSTS AND DELAYS

When one of the individual ropes on your English system rope drive stretches you simply place a clamp around each half of this coupling, hold one rigidly and twist the other.

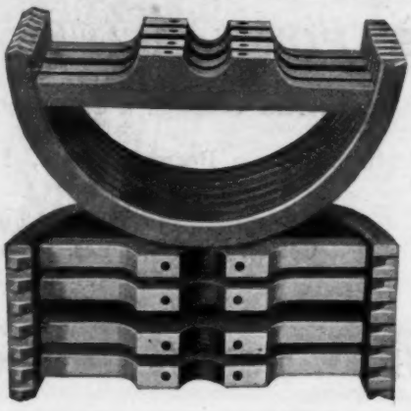
The rope is shortened by twisting up the strands and an internal lock holds the rope to the shorter length.

Hunt Coupling ready for use.

By this coupling you maintain the rope at its original diameter, control **all** stretch during its life and the rope is shortened without removing it from the pulleys.

Ask for Catalog W-15-1 giving full information regarding the coupling and describing our "Stevedore" Transmission Rope which is particularly made for power transmission purposes.

C. W. HUNT CO., Inc.,
WEST NEW BRIGHTON, N. Y., U. S. A.
61 Broadway, N. Y. City. Fisher Bldg., Chicago.
Munsey Bldg., Washington.



Consider Weight

Steel pulleys are from 32% to 124% heavier than "Excelsior" Wood Pulleys. What do you gain by putting this extra weight on your hangers and line shafting?

You gain nothing and you lose money every minute your hangers and shafting are carrying this extra weight.

Write now for further facts and figures. We'll be glad to give them.

EXCELSIOR PULLEY CO., Inc.
M. A. Howell, Pres. & Gen. Mgr. E. Z. Howell. V.-Pres. & Treas.
C. F. Zietlow, Sec'y.
CUBA, N. Y.

Cutting down the Nation's power bill

"American" Steel Split Pulleys are a national asset.

They conserve the country's resources by reducing the consumption of coal or current.

Air resistance is minimized by the strong arms, edge on, that *cut* the air and do not *fan* it.

Ample strength prevents breakdowns, accidents, and assures continuous operation and prolonged wear.

Belt slippage becomes negligible when the belt is holding all it will on any surface.

The proof of excellence is in the 3,000,000 "American" Steel Split Pulleys marketed in 20 years. Ask us or nearest "American" dealer for detailed reasons why.

AMERICAN
STEEL SPLIT PULLEY

Over 60,000 pulleys —3 inches to 120 inches in diameter— stocked for immediate shipment at centers named below, and additional thousands stocked by over 200 dealers.

AMERICAN PULLEY CO.

4236-60 Wissahickon Ave. Philadelphia, U. S. A. New York—33-35 Greene St. Boston—165 Pearl St. Chicago—114-116 S. Clinton St. Seattle—534 First Ave., South.

FREADRICH BELTING CO.

MANUFACTURERS OF

Oak Tanned LEATHER BELTING Surface Tanned and Waterproof

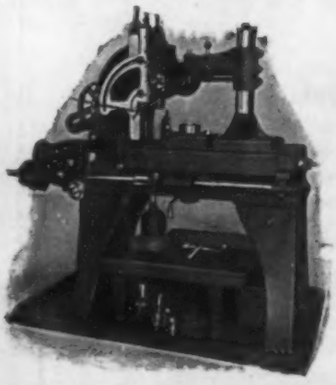
LACINGS
CEMENTS
DRESSINGS

SLABS
STRAPS

SOUTHERN REPRESENTATIVE M.E. STEVENS 316 PEACHTREE, ST., ATLANTA, GA.

St. Louis, Mo.

EXPORT DEPARTMENT NEW YORK, U.S.A.



Full Automatic, Semi-Automatic and Hand Operated

Gear Cutting Machines

Especially adapted for use in Cotton Mills. Hundreds now in use. Send for Special Circulars.

The D. E. Whiton Machine Co.,

NEW LONDON, CONN.

For Efficiency and Economy

Trade-Mark

Use NIGRUM Bearings

Reg. U. S. Pat. Off.

You'll never have to stop your machine, due to the neglect of someone to properly oil it, providing you use NIGRUM Bearings.

NIGRUM Bearings run smoothly and evenly without oil, grease or attention. They will save you money by saving you oil, and eliminate much of the wear and tear upon the working parts of the machine.

Also manufacturers of **BOUND-BROOK** Graphite and Bronze Oil-less Bearings.

Write for Interesting Booklet, "Oil-less Bearings."

BOUND BROOK OIL-LESS BEARING CO.

10 Church St., BOUND BROOK, N. J.

All Genuine Graphited "Oil-less Bearings" have always been made at Bound Brook, N. J., in the United States of America.

WEST POINT IRON WORKS

Cotton Mill Castings a Specialty.

Manufacturers Loom Beams, Presses, Inspector Tables.

Cotton Tie Machines.

Write us for prices.

WEST POINT, GEORGIA

ANTI-CORROSIVE CYLINDER OIL

TRY A BARREL FOR 60 DAYS

If it does not come up to your standard of what a good lubricating oil should be, and you consider that it is not worth our price—put your own value on it and remit on that basis. Isn't that a fair proposition? "A. C. C." will pare down your oil and cylinder repair bills—save your piston packing, too. It has been doing this for forty years, it will effect such a saving now—just give "A. C. C." a chance.

May we go into the subject with you?

ANTI-CORROSIVE CYLINDER OIL MANUFACTURED ONLY BY E. H. KELLOGG & CO.

E. H. KELLOGG & CO.
243 SOUTH ST. NEW YORK

B-W WELDING APPARATUS

Saved One Mill $12,000 Within One Month of Date of Installation.

This Mill was operated by water power.

The most essential casting broke, and rendered the water turbines useless.

A new casting could not be secured under eight weeks.

It was impossible to repair this part by ordinary means.

This mill was paying $250.00 per day for power until our men arrived and welded it in less than two days at a total cost of $26.00.

We would be glad to give you the name of this mill and many others we have helped out.

Write us today.

BIRD-WILCOX CO., Inc.

Atlanta Charlotte
Chattanooga Savannah

ANTI-FRICTION LUBRICANT
FLOTA MICA
TRADE MARK

COMES IN 5, 10, AND 25 POUND CANS.

WILL REDUCE YOUR OIL AND GREASE BILLS

and cool any hot bearing without slowing down the machinery

An ounce of Flota Mica in a gallon of oil or a pound of grease will reduce the friction load throughout your mill from the main engine to the textile finishing machinery.

Flota Mica permits of the use of cheaper oils and gives better results than you are now getting. Many concerns have cut their oil bills in half.

Flota Mica will not cake or harden, nor will it stop up the finest oil grooves.

Write for full information and service data.

Flota Mica Sales Co., 214 Moffatt Bldg., Detroit, Mich.

AGENTS:—A. H. Carriers, Security Bldg., St. Louis, Mo.; V. A. Moore, 1504 Healy Bldg., Atlanta, Ga.; H. W. Nickel, 1265 Broadway, Room 411, New York City.

Shafts, Pulleys, Hangers, Belting, Packing, Lacing,

BOILERS

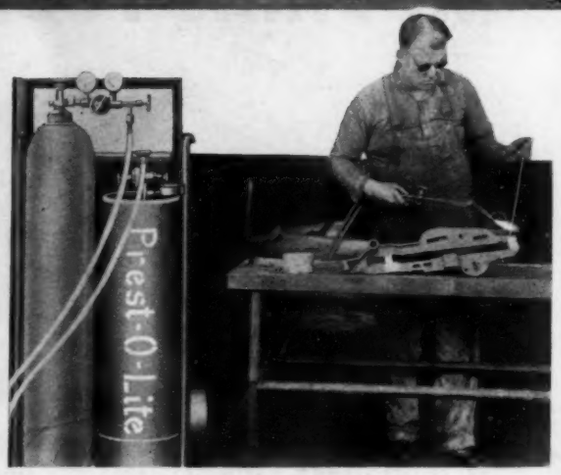
For Mills and Public Works, Low Prices.

Refer Chadwick, Hoskins, Woodside, Chiquola, Sibley, King, Enterprise, Langley, Piedmont and Pelzer Mills.

High Pressure Boilers built to Insurance Specifications. Rivet Holes Punched or Drilled. Pumps, Injectors, Pipe Mill Supplies, Castings.

LOMBARD Foundry, Machine, Boiler Work, and Supply Store,
AUGUSTA, GEORGIA

Oxy-Acetylene Welding and Cutting



Time and Money Saved by Welding This Shuttle Box

By the oxy-acetylene welding process this shuttle-box was made good as new at a cost of 50c.

In making this repair right in its own shop, this mill saved not only the cost of a new shuttle-box, but the valuable time lost while awaiting delivery of a new part.

Every textile mill has many opportunities to make substantial savings by the use of oxy-acetylene welding for repairing broken or worn machinery or tools, also for the reclamation of valuable material from the junk pile.

Prest-O-Lite PROCESS

Employs both gases (acetylene and oxygen) in portable cylinders. Prest-O-Lite Dissolved Acetylene (ready-made carbide gas) is backed by Prest-O-Lite Service, which provides dry, purified gas, insuring better welds, quicker work, and lower cost, and also avoids the large initial outlay and heavy depreciation incurred in making crude acetylene in a carbide generator.

Necessary equipment is not expensive. We furnish high-grade welding apparatus for $60 (Canada $75); acetylene service at additional cost. Adaptable for oxy-acetylene cutting by the addition of special cutting blow-pipe. Thorough instructions are furnished free to every user of Prest-O-Lite Dissolved Acetylene—any average workman who understands metals can learn the process quickly and easily.

Ask for valuable data showing the work others are now doing and how readily you can effect equal savings in your mill.

The Prest-O-Lite Company, Inc.

The World's Largest Makers of Dissolved Acetylene

U. S. Main Office and Factory:
836 Speedway, Indianapolis, Ind.

Canadian Office and Factory, Merritton, Ontario.

53 Branches and Charging Plants

Machine Tools—Mill Supplies
and
Foundry Equipment

We represent the following companies:

Whiting Foundry Equipment Co.
Landis Bolt Cutters
Gould & Eberhardt Shapers and Gear Cutters
Lodge & Shipley Lathes
Cincinnati Bickford Upright and Radial Drills
Acme Turret Lathes
Blanchard Surface Grinders
South Bend Lathes
Skinner Lathes and Drill Chucks
Cincinnati Millers and Grinders
Cincinnati Planers and Boring Mills
Bullard Boring Mills and Vertical Turret Lathes
Cleveland Open Side Planers
Williams White Punches and Shears
Stoever Pipe Cutting Machines
Baker Bros. Drills and Keyseaters

High Class Line of

Belting
Hose
Packing
Pipe
Valves
Fittings
Elevating Machinery
Conveying Machinery
Power Transmission Machinery
Pumps
Air Compressors
Gas and Oil Engines

When in the market for apparatus manufactured by the above concerns, we guarantee you prompt service and absolute satisfaction. Let's get acquainted.

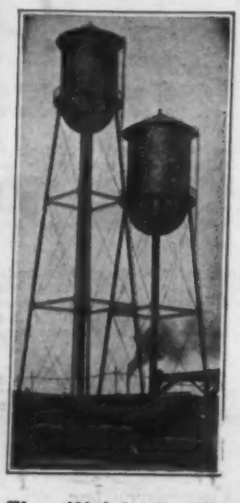
See list of stock on hand on page 184.

SEEGER-WALRAVEN CO.

28 West Alabama St., Atlanta, Ga.

Economy is Buying Wisely—Not Cheaply

TOWERS and TANKS
That are Built Right



Boilers,

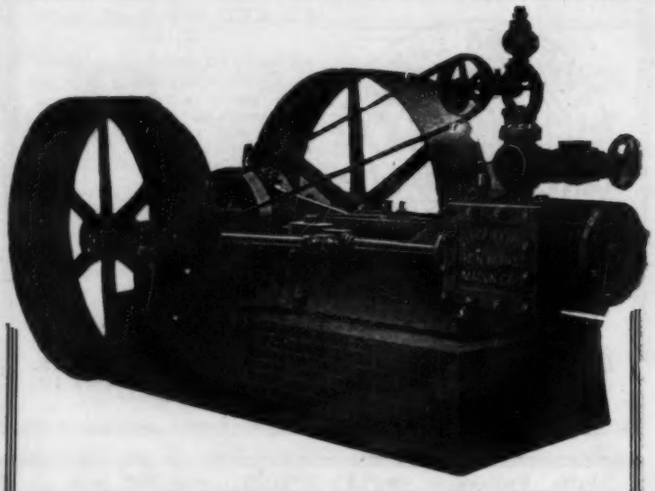
Structural Steel Work

Sheet Steel and Plate Work

Boiler Tubes, Castings, Etc.

Tell us what you want and let us quote prices.

The Walsh & Weidner Boiler Co.
Chattanooga, Tenn.



J. S. SCHOFIELD'S SONS CO.,
Macon, Georgia

MANUFACTURERS OF

High Pressure Return Tubular Boilers, High Grade Stationary Steam Engines, Tanks, Stacks, Stand Pipes.

Heavy Castings and Wrought Iron Works.

What a Condenser is to An Engine a "SPRACO" System is to a Condenser

If you could get **free** as much coal as you want, there would be but a few minor reasons for operating an engine condensing. Condensing is a matter of efficiency—which is economy. But you **do** pay for coal—consequently you buy a well-known or well-recommended condensing outfit because it saves on your fuel bill.

By the same token—if you have not all the cool water you need, you require some means of re-cooling your condensing water. A "Spraco" System will give positive results. The same sound judgment that you used in selecting a good condenser should be used in selecting specialists to lay out and install your cooling system. It is significant that we have had years of experience and can refer you to over 350 successful "Spraco" installations.

If you are mulling the matter over, you will find food for thought in our free booklet, "Cooling Ponds for Condensing Engines," which shows 10 to 20 per cent gains in efficiency in power plants from Cuba to Alaska.

Spray Engineering Co., 93 Federal Street, Boston, Mass.

Atlanta, Ga., - - Earl F. Scott, 707 Candler Bldg.
Birmingham, Ala., - - McClary-Jemison Mchry. Co.
Charlotte, N. C., J. S. Cothran, 200 Commercial Bank Bldg.
New Orleans, La., A. M. Lockett & Co., Ltd., 533 Baronne St.
Houston, Tex., Tenant-Lovegrove Co., Union Nat. Bank Bldg.
Dallas, Tex., Smith & Whitney, Southwestern Life Bldg.

SPRACO PRODUCTS

SPRACO PRODUCTS

You get the safety you work for and build for and no more

FOSTER

Combination Emergency and Non-Return Valve
(4 Duty Type)
takes boiler-room safety out of the region of guess-work.

1. Automatically closes in case of accident to boilers, cutting any disabled boiler out of battery and preventing flow of steam from other boilers into the disabled one. Steam cannot enter a cold boiler or one in which steam is being raised.
2. Closes automatically when there is a break in main line or fittings.
3. Emergency lines with small globe valves at convenient points permit the isolation of any boiler from a distance.
4. The valve may be closed by hand.

The engineer who is thoroughly aroused to the possibility of trouble in his plant leaves nothing to chance and keeps at getting ready. That is hard common-sense.

Why not look over the intelligent data in the New Foster 1917 Catalog. Ask for No. 30.

FOSTER ENGINEERING CO.

NEWARK, N. J.

180 No. Dearborn St., - - - - - Chicago, Ill.
161 Summer St., - - - - - Boston, Mass.
404 Arrott Bldg., - - - - - Pittsburgh, Pa.
712 Harrison Bldg., - - - - Philadelphia, Pa.

Wolf's Elastine Laquer

A Super-Varnish

used exclusively in the

Union Central Bldg.

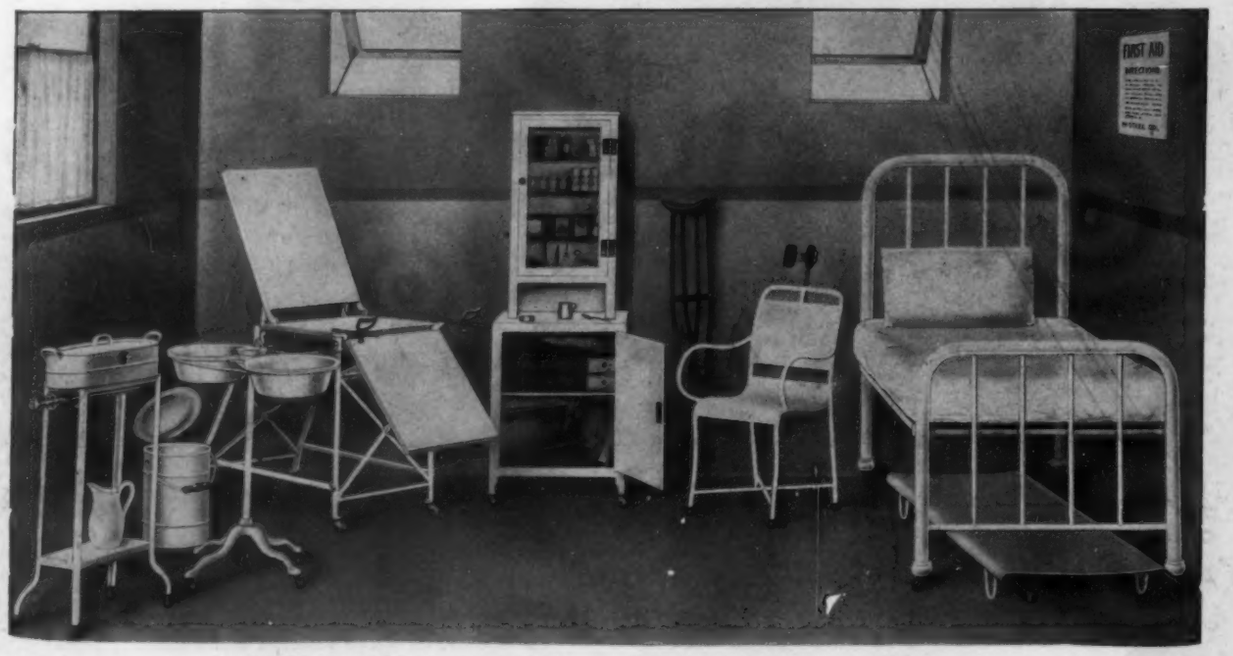
Cincinnati

—the largest sky-scraper west of New York.

Why? Because it is guaranteed to outwear any varnish on the market today. Will not scratch, check or break.

Send for free sample.

Leon L. Wolf Paint Co.,
304 Lincoln Inn Court
Cincinnati, - O.



A NEW INDUSTRIAL FIRST AID OUTFIT.

Designed by the surgeon in charge of one of the largest Industrial plants in the country, and comes complete with everything needed for First Aid work.

Let us quote you manufacturer's prices on our New First Aid equipment or on a special outfit that better meets your requirements. Send for booklet describing First Aid or Emergency equipments.

FRANK S. BETZ CO. - - - - HAMMOND, IND.

MISSISSIPPI WIRE GLASS

Postex Cotton Mill, Post, Texas

is installed for Fire and Breakage Protection, Light Diffusion and Minimizing Cost of Maintenance.

Let us mail you samples and literature which will give valuable information.

MISSISSIPPI WIRE GLASS CO.
217 5th Ave.
NEW YORK.

7 W. Madison St., Chicago, Ill.

4070 N. Main St., St. Louis, Mo.

Protection!

Is something that every factory needs in this day of labor troubles and war contracts. No matter how many watchmen you employ, you cannot depend on them to absolutely protect your property against marauders. How many unexplained fires and explosions have you read of in the last year or two? Why take any chances when you can buy such absolute protection from these disasters by surrounding your plant with a

STEWART FACTORY FENCE

Its patent three ribbed channel rail makes it by far the strongest fence on the market. Where other fences having a **two ribbed rail** are weakened by calking the pickets into place, Stewart **three ribbed rail** fences are strengthened.

Thief-proof, fire-proof, riot-proof, and time-proof, this fence more than meets **ordinary** requirements. With over thirty years' experience responsible for its construction and design, it represents the **best**; the most in satisfaction and service. Yet you pay no more for a Stewart Fence.

Let us help solve your fence problem.

Write today for catalog and list of prominent users.

THE STEWART IRON WORKS CO.,

"The World's Greatest Iron Fence Works"

625 Stewart Block, Cincinnati, Ohio

VOGEL

PATENTED

Frost Proof Closets

Quarter of a Million giving satisfaction. Save Water; Require No Pit; Simple in the extreme. The most durable water closet made. In service winter and summer.

No. 1.

- Enameled roll flushing rim bowls.
- Heavy brass valves.
- Strong hardwood seat.
- Galvanized tank.
- Malleable seat castings will not break.
- Tested under hydraulic pressure before leaving factory.

SOLD BY JOBBERS EVERYWHERE.

JOSEPH A. VOGEL CO.

WILMINGTON DELAWARE

Permanent Roof Protection Doubles Its Life

Gilso Cement is a tough, elastic, tenacious roof cement that can be applied by any spare man around your mill. Any roof to which Gilso Cement is appl ed becomes permanently waterproof, not for a month or a year, but for a period of years, and is good as long as there is surface for it to adhere to. It remains elastic under all weather conditions.

It is highly recommended for the painting of metal or any surface that you des re to protect against water, acids, alkalis or sulphuris gases. It absolutely prevents corrosion and decay.

Gilso Cement is about four times thicker than paint, yet can be applied with a brush.

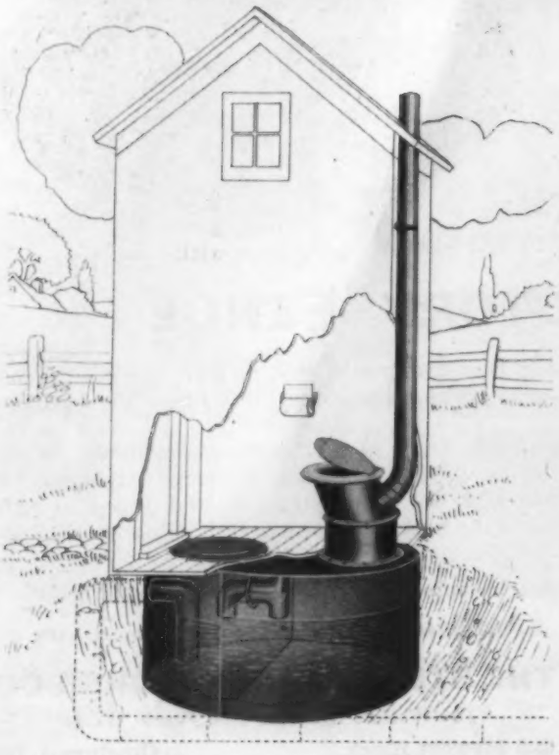
Give it a trial and convince yourself that Gilso Cement is by far the most practical and economical mater al for the protection of all exposed surfaces. Fill out the coupon and mail today.

The High Grade Manufacturing Co.

Cleveland, Ohio.

The High Grade Mfg. Co.
Box 93, Station H, Cleveland, O.
Send us prices and testimonials from large users.
Name.....
City.....
State.....

SICKNESS DECREASES YOUR PROFITS



You can prevent much of your employees' sickness.

The unsanitary surface closets in your mill town cause a large percentage of the sickness of your employees. Sickness causes loss of time, **loss of efficiency—loss of profits.**

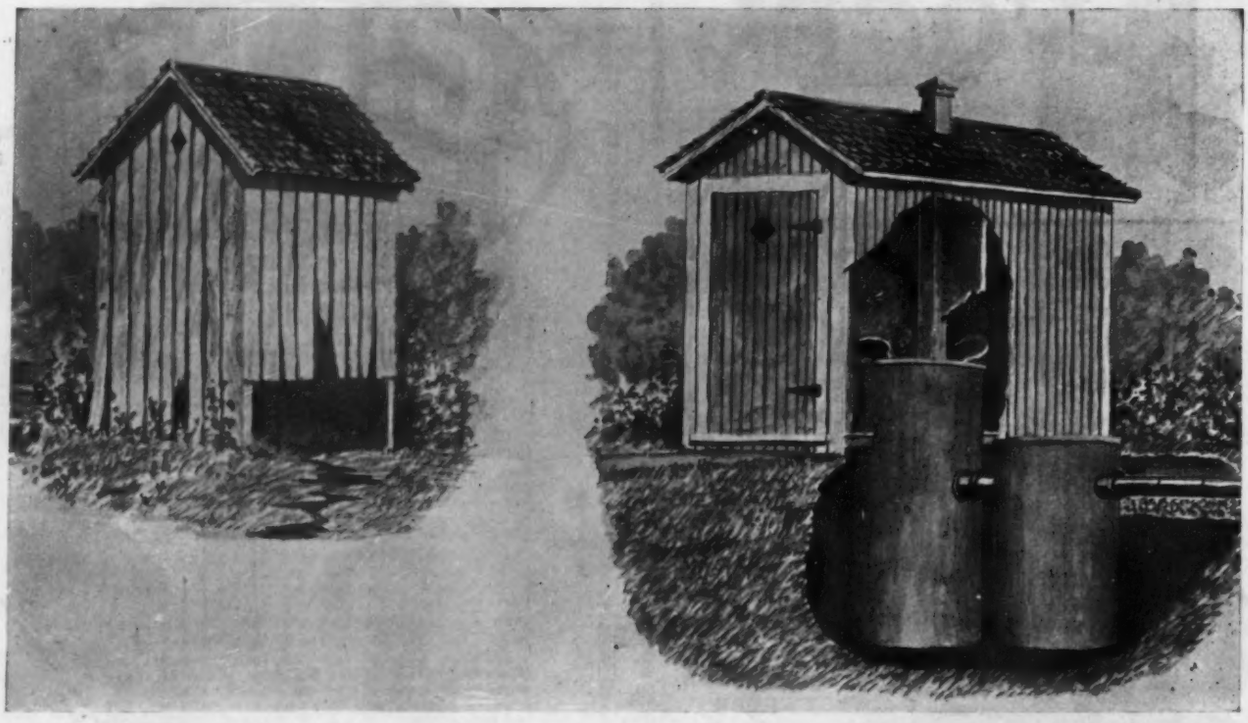
Install a Septic Tank beneath each closet and insure your workmen's efficiency—and your profits. These are made of Rust Resisting Armco Iron—therefore they are long lived.

These Septic Tanks are inexpensive and they pay large dividends.

Send for literature and prices.

THE DIXIE CULVERT & METAL CO.

ATLANTA, GA.



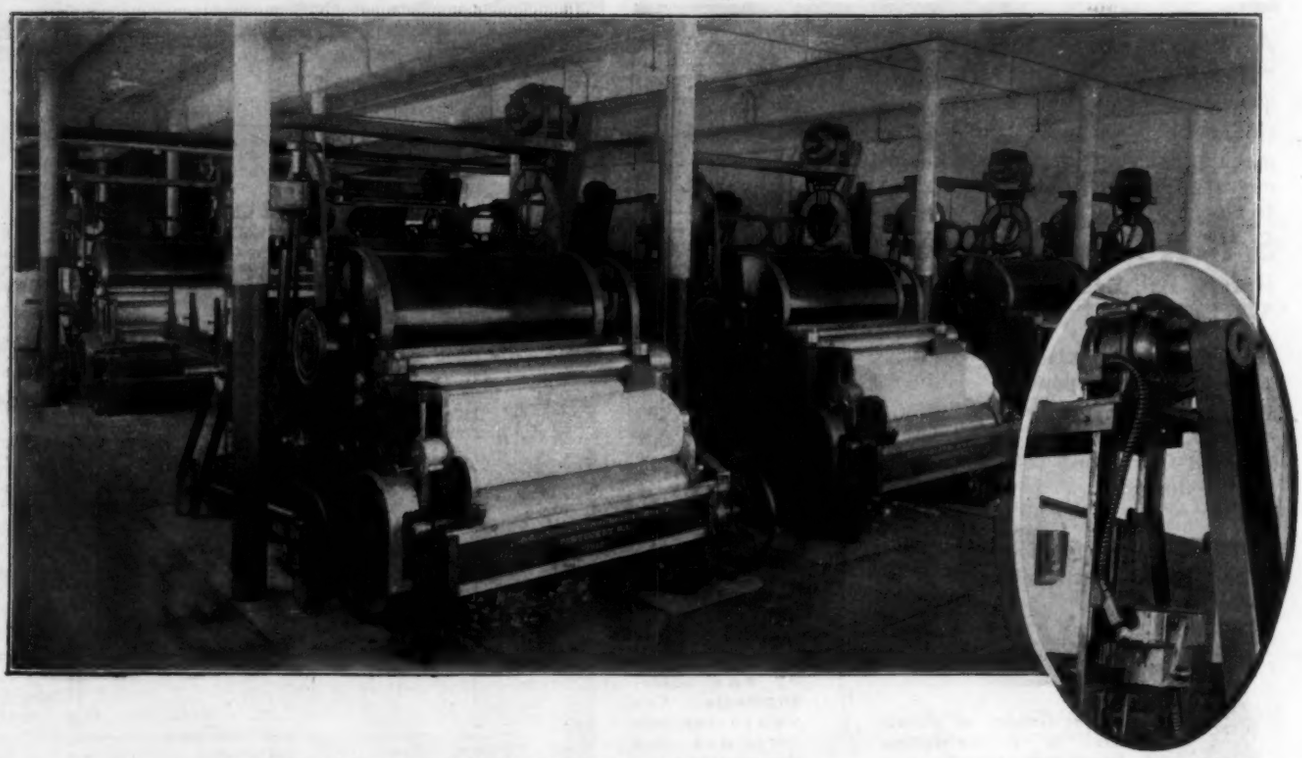
Soil pollution and disease originate here.

Patented.

No. 2 "SANISEP" System with partition, for two houses.

WHICH IS YOUR MILL VILLAGE EQUIPPED WITH?

CEMENT PRODUCTS COMPANY, Wilmington, N. C. Manufacturers of "SANISEP" Tanks.



G-E Motor Driven Pickers, Greene & Daniels Co., Pawtucket, R. I.

Control Switch may be mounted on machine.

Specially Designed G-E Picker Motors Have a Splendid History

A quarter century ago pickers were first driven by G-E motors and these motors are still in satisfactory operation. To make better G-E motors and to make them most fit for their work our experts are constantly at work. They test out new designs under actual working conditions in various mills. In all developmental work they are guided by a wide experience in supplying 75% of the electric motor equipment in this country's textile mills.

The new G-E picker motors are highly efficient and have a close speed regulation. Their windings are given a special moisture proof treatment to stand sprinkling. Waste packed bearings which require infrequent oiling, screens in bearing heads to keep out lint, and a universal terminal box are other features which enhance the sterling worth of these tried and proven motors.

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6546

AN ARCHITECT ONCE SAID:

"A hole in the roof is NOT ventilation."

The SWARTWOUT is not a mere stationary hole in the roof—it is a semi-mechanical ventilating machine without operating expense which **"puts the wind to work."**

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VENTILATORS

are ideal for textile mills as our repeat orders from textile users prove. In writing ask for names of textile users.

The miniature model carried by our sales-engineers for your convenience—ask for demonstration.

"The Gospel of Fresh Air" is a ventilation handbook as well as a catalog. Free on request.

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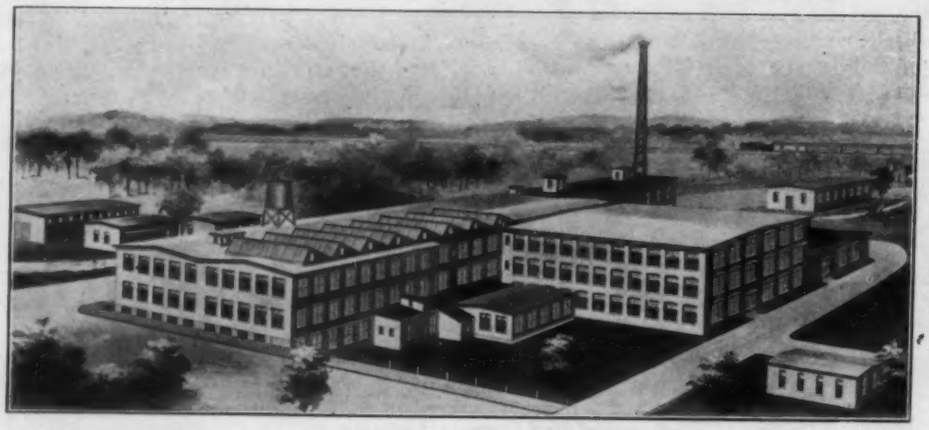

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Also—Facilities for Winding Cotton Yarns on Paper Cop Tubes for the Shuttle, also on Beams and Cones and Parallel Tubes.

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COTTON

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When changing address, *notify us*, not the postmaster. Always give the old address as well as the new one.

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Volume 81. **Member Audit Bureau of Circulation.** **Number 4**

ADVERTISING HELPS TO KEEP PRICES DOWN.

Two prominent business men were talking things over not long ago. One of them asked the other, "What is the most common delusion in the business world today?" Instantly came the reply, "The idea that advertising adds to the price of goods."

Every now and then some manufacturer has the hardihood to say that he can sell his goods cheaper because he doesn't advertise. Every one who knows the A B C of business knows that this claim is impossible on its face. Yet it sounds plausible and such talk deceives millions of people.

Forget all these sophistries and listen now to the plain commonsense of the matter.

In the production and marketing of goods there are two inevitable costs. One is the manufacturing cost; the other the selling cost. And no way has ever yet been found by which either of these costs can be eliminated. Mark that.

Whether you buy farm products at a grocery store, or mill products at a dry goods store, or laboratory products at a drug store—whatever you buy at any store, be sure of one thing: The price includes the selling cost. It must, else the manufacturer, the wholesaler, the retailer and the salesman could not live.

And just as surely as there are always two items of cost, the manufacturing and the selling, just so surely are there only two ways in which the price of goods can ever be reduced.

One is by economies in manufacturing cost. The other is by economies in selling cost.

Of course, it isn't easy to cut manufacturing cost without cutting the quality.

But in modern times a way has been found to cut selling cost—and its name is Advertising.

Advertising is like a straight line: the shortest distance between two points—the producer and the consumer. It cuts out the grades, curves and the angles. It makes a drop of ink do the work of a salesman. Bear in mind that goods can never be sold unless there is a demand and advertising creates this demand in the simplest, most direct and least expensive way. No other sales method can equal it in magnitude of return for a minimum of cost.

And the big returns from advertising also cut down the manufacturing cost — that's another saving. Increased volume of production always means a decrease in the unit cost of production through better and more efficient manufacturing methods.

The Association of National Advertisers has recently been gathering some remarkable facts and figures on this subject. They show how one after another of the big advertisers of the country have been able to reduce the price of their product or else to improve the quality at no increase in price. It is a significant fact that nationally advertised goods are the only products which, as a class, have not tended to rise in price during the past few years.

Countless causes are working today to force prices up. We all know this by sad experience. Against all these forces one force only is working to keep prices down—and its name is Advertising.

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EXTRACTS FROM OUR DAILY CORRESPONDENCE.

From a textile manufacturer in Connecticut:

"I am very much pleased with COTTON and think the same the best of its kind."

From one of the large dealers in mill stocks and bonds:

"We have received our copy of COTTON containing the financial reviews printed therein and beg to compliment you on the getting up of your book, which is a credit to you and to our country. We doubt if there is anything better anywhere published."

Previous Cost 37½ ¢
Present Cost 8¾ ¢
Saved on each boiler tube 28¾ ¢

If it cost 37½ cents per tube to clear a boiler of scale by one method and later, it cost 8¾ cents per tube to clean the same boiler and leave it in excellent condition by the Dixon method, don't you think that the Dixon method is worth while?

DIXON'S PIONEER BOILER GRAPHITE

"the boiler graphite that gives results"

By the use of Dixon's Pioneer Boiler Graphite (Flake Graphite), fuel bills are reduced, the cost of cleaning minimized and the boiler is kept in excellent condition. Points that all mean a substantial saving in operating costs.

Booklet No. 34-T is well worth sending for. It costs you nothing and may mean everything to you.

Made in Jersey City by the

JOSEPH DIXON CRUCIBLE CO.

Established 1827

T-51

Tycos

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INDICATING
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There's a *Tycos* or *Taylor* Thermometer for Every Purpose

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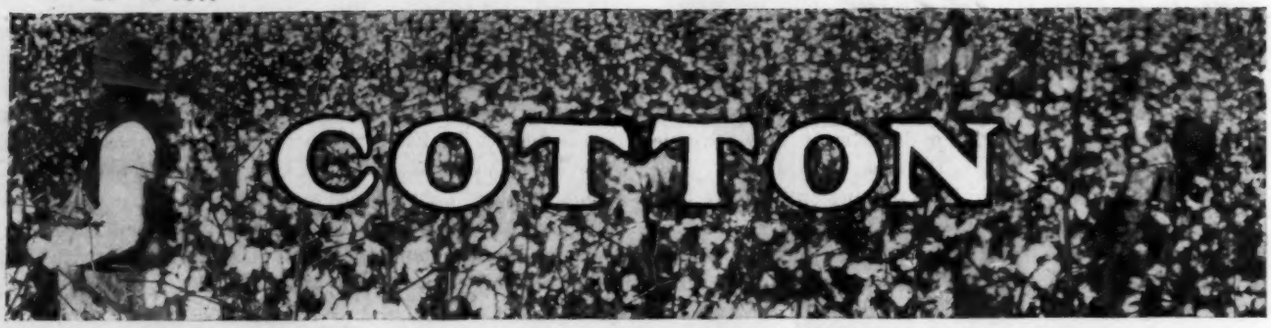
The Value of a Trade Mark Is the Quality of the Product Behind It.

We are so sure of the quality of our rawhide loom pickers that we wish to be identified with each one of the pickers which we send out, and therefore stamp our trade mark in the hide of the picker so that it may be plainly seen even when the picker is worn out.

GARLAND MFG. CO.
SACO, MAINE

G
TRADE MARK

FEB 15 1917



February, Nineteen-Seventeen.

Artels in Russia.

An interesting outgrowth of war conditions in Russia is outlined in "Russia", a monthly magazine published by R. Martens & Co., Inc. This is the appearance of two new kinds of artels, which are corporations of workmen formed for the purpose of marketing their labor or specialized capacities to greater advantage than is possible for the individual acting alone. Artels correspond, superficially, to labor unions in this country; but in fact they have no such power. They are corporations, in the first place: and they are collectively responsible for the actions of each of their members—a fundamental difference from American conditions.

The agricultural artels distribute seeds among their members, buy in common one or two agricultural machines, carefully cultivate all the fields of the artel, and sometimes aid farmers outside who can pay for help. Their greatest service is in better marketing of crops.

Engineering artels are another recent development. The members are engineers only, and the artels themselves undertake all sorts of contracting work, guaranteeing its proper completion, and making thmselves responsible for it. They usually specialize according to the technical education of the membership in different branches of engineering: architecture is also included; each artel deals with only one specialty. These artels often represent large foreign firms, and undertake translations among their other work.

The chief purpose of the banking artels is to supply banks, large offices, corporations, etc., with bank messengers and cashiers. The artel is responsible for its members, and refunds any money misappropriated by them in the course of their employment. The capital of banking artels is usually deposited in large banks. It consists of fully paid up shares of the artel itself, and of contributions paid by the members on the basis of a salary percentage.

The commoner type of artel is that formed by a group of workers in a single trade, who choose a leader to act as their agent in arranging for their employment by contractors and others. In the building trades these artels are numerous, most of them being of relatively common grade workers. Other artels in this field, however, employ only the more skilled workers; and this enables them to undertake contracts without having recourse to the services of intermediaries.

This is working out the labor union idea in a safe and sane manner, and if there is any advantage in collective bargaining it is retained. At the same time the artels or unions are corporations and collectively responsible for the actions of individual members. This is an important feature which is carefully omitted in the forming of American labor unions.

All Americans are united in the desire to see labor receive a full and just compensation for work performed and to have the conditions of labor made easier and more sanitary. That this cannot be accomplished by strikes and by class legislation is shown by the records of every state where a conflict between labor and capital has occurred.

More than any other one thing the American citizen should preserve his right of individual freedom—the freedom to life, liberty and the pursuit of happiness. Happiness in this world means contentment and contentment may not be secured for the majority except through the free power to contract for labor—the individual right to work. The average man must earn his bread by the sweat of his brow and any organization or political power that seeks to abridge this right is striking at the most vital element of human freedom.

This is the sword that is being suspended by American labor unions. The "closed shop" system of the labor union strikes a death blow at the freedom of the individual—at his right to work. It seeks to dominate the employer, and through him, those he shall employ.

American citizens should hold true to the American principles of liberty, equality and fraternity and should denounce in no uncertain terms those political servants who aid in placing upon the statute books legislative enactments that favor a class or abridge the right of individual contract—the right to work.

Use Standard Fire Equipment.

Frequently manufacturers feel that the aggregation of post indicator valves, hydrants, hydrant houses and hose pipe that adorn the landscape surrounding the mills is largely for show and to keep the insurance inspector from turning in an adverse report to his company. Sometimes no large part of this heavy equipment has been used, except for test purposes, within the recollection of the man in charge. There are, however, occasional illustrations that bring to mind with dramatic effect, the tragic comedy of the American anarchy in hydrant threads and hose couplings.

The inconvenience of such a system was illustrated at the big Augusta fire in March of last year, when in response to the telegraphic cries for help, many of Augusta's friendly neighbors rushed in, and were able to accomplish but little. The Waynesboro department, thirty-two miles distant, took over a big automobile combination chemical and hose wagon and 1150 feet of hose, but no pump, making the

run in forty-five minutes under its own power. It tried to couple on to two or three hydrants, and found that the Waynesboro hose threads did not match the Augusta hydrant threads. The Macon department came 125 miles to learn the same thing. The Atlanta department sent equipment 171 miles and found itself in the same predicament. Surely such efforts at friendly aid have nothing on "Happy Hooligan".

This is only one feature of the proposition. The importance of information gained from accurate testing as opposed to guess work, was recently illustrated anew at Allentown, Pa. Last October the Copley Cement Manufacturing Co., of Allentown, had a fire in its stone bunker, presumably from a locomotive spark. The bunker was of slow burning construction, the fire was quickly discovered and the mill fire squad responded promptly; there should have been little loss.

The fire squad attached the couplings of the plant's expensive new fire hose, ran it to the blaze and turned on the water. The hose burst in five or six places and the fire merely gained headway. The disgusted squad hurried to uncouple the hose and throw in another length, which immediately burst like its predecessor.

By the time a successful stream was finally secured, the fire was burning fiercely, and the loss amounted to $7,000, which was almost entirely due to the failure of the hose.

Why did the hose burst?

In a report on this fire by the National Board of Fire Underwriters, attention is called to the fact that the hose was not old, but new. The company had not economized by purchasing cheap hose; on the contrary, it was reported they had taken a special measure of precaution and specified and paid for hose inspected by the Underwriters Laboratory.

It is alleged that the agents of the manufacturers who sold this faulty hose made the false charge that the Underwriters' hose, to a large extent, is "a game of graft on the part of the insurance companies," and naturally discrediting the value of the rigid inspection made by the Underwriters' before a label is permitted to be placed upon fire hose by the Laboratories.

The incident serves to emphasize the need of proper testing to safeguard life and property and three important points in connection with this fire deserves consideration:

1st. The hose in question was not Underwriters' hose. It is reported to have been sold for Underwriters' hose and to have included in the price the Underwriters' charge of one cent per foot for inspection.

2nd. Before an Underwriters' label may be attached, each length of mill yard fire hose is tested at the hose factory under three hundred pounds pressure by an inspector of the Laboratories, and must be shown to withstand the pressure test before it may be used. The defective hose at Allentown did not bear this label and is reported to have burst at a pressure much less that the three hundred pounds required.

3rd. The Laboratories' test is the direct opposite "of a game of graft." It is maintained under the direction of the National Board of Fire Underwriters in the interest of public safety at a large annual expense to the companies. The charges made for inspection are nominal and the work is not intended to and does not produce a profit.

Any product that can comply with the standard of its tests can secure its label, but no product will be labeled under any circumstances until it has withstood the rigid test necessary to prove its worth in time of need.

The lessons of this incident are two fold. In the first place, life and property may be, and often are, sacrificed to imperfect fire hose. In the second place, those who wish the security furnished by fire hose tested and passed by the Underwriters' Laboratories must make sure that each length bears a label certifying to such test. Without such label, any statement by any salesman to the contrary notwithstanding, the hose is not "Underwriters" hose.

Convention of Georgia Manufacturers.

The annual convention of manufacturers which is to assemble in Savannah for a two days' session, beginning Wednesday, February 14th, bids fair to be an occasion of much interest. The Georgia Manufacturers' Association, under the auspices of which the convention is being held, has been devoting itself for some time past to the perfection of a program that is designed to meet a full and free discussion of many questions of consuming moment. These questions are to be discussed primarily by selected speakers chosen for the occasion, and then by open forum discussion.

At the time of the writing of this article, the tentative program lists an address by James A. Emery, General Counsel for the National Association of Manufacturers. Mr. Emery's broad knowledge of the field of national legislation, as made applicable to industry, peculiarly fits him for a discussion of pending questions before the National Congress, with an expose of arguments that are being used to affect the passage or defeat of legislation that may be pending in which manufacturers are largely concerned. Mr. Emery's discourse is expected to be highly enlightening in the detail of current legislative procedure, and what is likely in the way of new laws by the Federal Congress.

Hon. Edward N. Hurley, until recently Chairman of the Federal Trade Commission, is also among the list of speakers, and will address himself to the subject of Cost Systems in Factory Management.

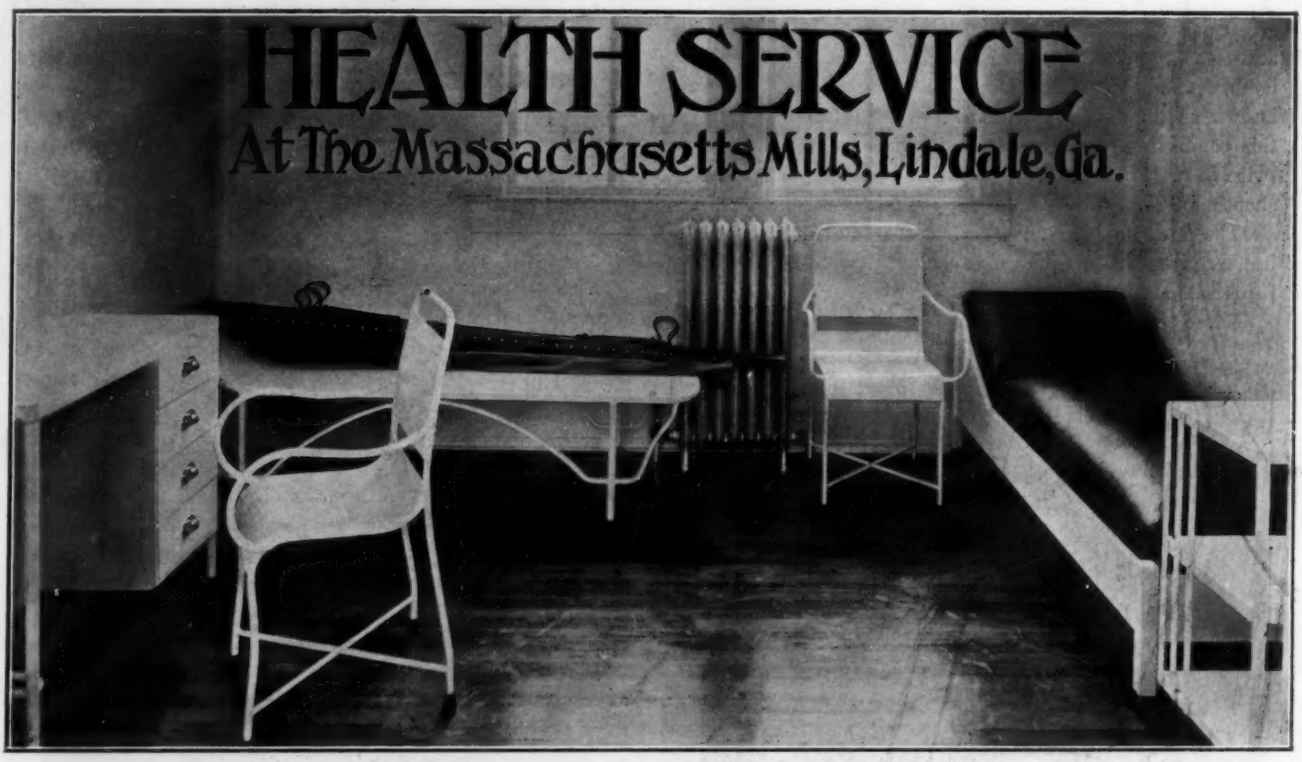
J. E. Edgerton, president of the Tennessee Manufacturers' Association, will address the Convention upon the achievements of the Tennessee association. Mr. Edgerton is a brilliant speaker and has a wide business experience.

In addition to the speakers provided for and open discussions to be had upon various subjects, the program also contains reports by selected committees upon subjects of economic importance, each of which has been given careful consideration.

Aside from the business feature of the convention, the program also contains a diversion to pleasure, predicted to be the source of much enjoyment. Visiting manufacturers are to be the guests of Savannah manufacturers at an oyster roast at two o'clock on the first day of the session. This roast will be given at the Savannah Yacht Club, to which the visitors will be conducted by automobiles. A motor boat race will be an added feature of this occasion, to be witnessed by all in attendance. On the following day Savannah manufacturers will also entertain their visitors at a luncheon at Hotel Savannah, the convention headquarters.

It is expected the convention will be largely attended, as much interest is being manifested.

HEALTH SERVICE
At The Massachusetts Mills, Lindale, Ga.



THE MATRON'S ROOM.

Much has been written on the subject of accident prevention. The necessity for instilling a spirit of caution into the employees is, and should be, well understood and appreciated. This part of the movement is of primal importance, and if successfully prosecuted, will go a long way toward eliminating accidental injuries around the factory.

The next line of thought introduced and prosecuted, is the safeguarding of machinery and equipment so as to make accidental injury almost an impossibility.

However, the 1914 statistics of the Massachusetts Industrial Accident Board, relating to the cotton industry of that state, shows that over 26 per cent of the non-fatal accidents occurring in the twelve months ending July first, 1914, were caused when the persons injured were engaged in strictly hand labor. Of the non-fatal accidents during that year, 4,431 injuries out of a total of 7,776, or about 57 per cent of all the injuries of that class in cotton mills, have no connection whatever with machinery. Therefore, while the safeguarding of the machinery will materially assist the other 43 per cent that arose from machine operations, 57 per cent must depend on the "spirit of caution" which mill managers are trying to instill into the minds of their operatives.

Any student of human nature will appreciate the fallacy of an argument which even intimates that such an appeal to the large operative class, will have any effect other than partially reducing the percentage of accidents. Therefore, the next move made necessary by this situation is the establishment of an emergency accident or first-aid room, within or near the walls of the factory itself, where slight injuries may receive immediate and suitable attention.

Referring again to the Massachusetts statistics, we find that 160 persons were injured when handling trucks or wheelbarrows, 307 were hurt by protruding nails, 147 by glass, 172 suffered infections from slight scratches or cuts, 153 suffered burns, 87 fell down stairs, 509 fell while walking on floors, 98 fell from ladders or scaffolds, eleven were injured by animals, 313 sustained serious eye injuries, considerably over 1,000 injuries were caused by slivers, and 412 arose from various other sources. Suitable attention in minor accidents of this character reduces the liability of their resulting seriously. It is not a question of who is responsible for the health of the worker in industry. It is working to the end that after an employee has been trained to do a particular class of work, he is a more valuable man on that class of work than another would be, who lacked the experience of the first man. Therefore, the necessity, from a purely business standpoint, of keeping the first man in good physical and mental condition, is at once apparent.

While it is usual to put great stress on the promotion of physical efficiency among the workers from a purely selfish standpoint, this condition is sought by many managers, not as an end in itself, but because through the conservation of health, the life of the individual acquires a richer and more valuable content. Advocates of national preparedness perceive that through the conservation of individual strength and power, the nation will be enabled to assert itself, and to act effectually in time of need. It is therefore evident to the careful observer, that the industrial health movement is not altogether actuated by the enlightened seeker after profit.

With these, and similar statistics at his disposal from year to year, Captain H. P. Meikleham, Agent at the Massachusetts Mills In Georgia, Lindale, Ga., has consistently advocated and applied many of the forms of health service adaptable in his particular plant. A number of years ago,

appreciating the military unpreparedness of the country, and also the value of military discipline among his workers, he organized an independent militia company, which is known as the Lindale Rifles. It is of interest to note in this connection, the Lindale Rifles have captured the first prize in marksmanship in competition with the other sharpshooting teams of the state for the last several years.

The Lindale baseball team, also recruited at the mill, has acquired the reputation of being unbeatable except by professionals.

These two organizations call for music, and the Lindale

THE HEALTH SERVICE BUILDING.

Band was formed, and has now reached the point where it is as good an amateur band as can be found south of the Mason and Dixon Line.

In order to place these organizations upon a self-supporting basis, where they would belong to the mill people, and not be children of the mill itself, suitable moving picture outfits were equipped and operated in the mill village for the benefit of these organizations, so that the real support comes from the people rather than from the mill.

The interests of the women employees has been suitably looked after under the auspices of the Home Economics Branch of the Health Service.

Captain Meikleham has also devoted a great deal of his time and thought to the sanitary conditions prevailing at the mills and in the village of Lindale, and during the latter part of 1916, a committee of surgeons from the U. S. Public Health Service at Washington, who were invited to Lindale to make a complete inspection of the sanitary equipment, spent several weeks in the village, and gave the plant and its surroundings a rating of 97 per cent.

During his many years as a successful manufacturer, this energetic mill agent has felt the need of a suitable matron to be located at the mill and to give her personal attention to the female employees. A large number of female workers are used in every cotton mill, and inasmuch as a great deal of the work is performed while standing, there are times when individual operatives are not in a suitable physical condition to do this work to the best advantage. However, as all the department foremen are men these employees sometimes feel a delicacy about stating the true condition to their immediate superior. It was also very evident that a better equipped first-aid room for the treatment of emergency accidents would be a distinct advantage. In order to meet these two needs in a suitable manner, the industrial health service building, shown in the accompanying illustrations, has just been completed and equipped. It is located between the two main mill buildings, and connects with the connecting building, the floors of the two buildings being level.

This building, as will be seen from the illustration, is of regulation mill construction on the outside. It contains three rooms and a connecting hallway. This hallway opens at one end into the connecting building between the mills, and at the other end into the operating, or first-aid room. A door on one side of this hallway opens to the walk leading to the office. Almost immediately opposite the outside door of the building is located the entrance to the matron's office and examination room. The floors of the hall and the matron's room are of maple, while the floors of the operating room and lavatory are of tile parquetry. The walls and the ceilings of all these rooms are finished in cement plaster. They were then given three coats of flat white, followed by two coats of vitralite enamel. All corners are finished round, to facilitate cleaning, and the windows

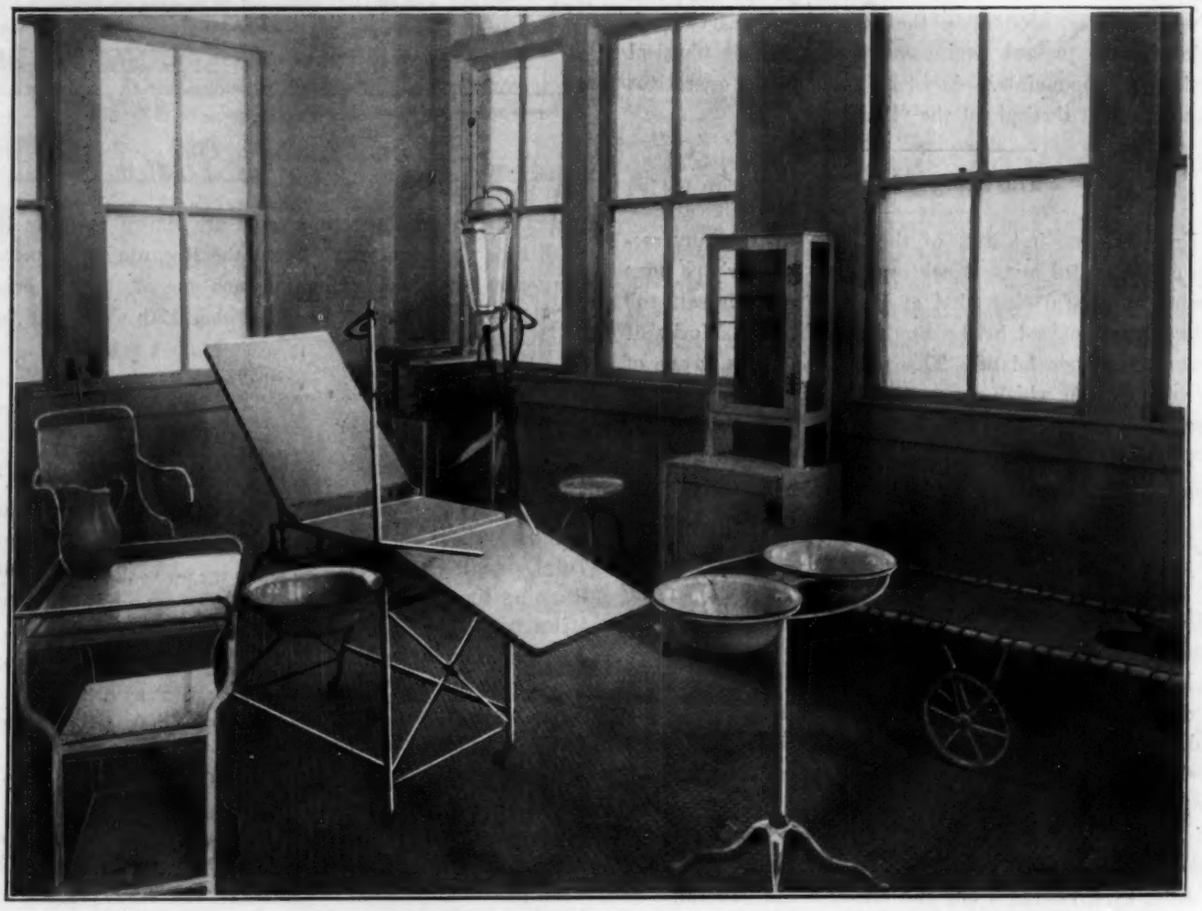
THE LAVATORY.

are of ribbed glass, which provides suitable lighting, and at the same time obviates the necessity of having curtains or shades to prevent persons on the outside from observing what may be transpiring within the building.

The matron's room contains a desk, two chairs, a revolving book-rack, an iron cot and a leather covered couch.

On the iron cot, may be seen a canvas stretcher for emergency purposes. The size of this room is not suitably indicated in the photograph, owing to the inability of the photographer to secure a position which would show the whole room. Also some further equipment will be added later.

Between the matron's room and the operating room is a suitable lavatory connecting with each. This lavatory contains a bath-tub equipped with hot and cold water and shower arrangements, a large set wash-bowl with spray attachment, a suitable toilet and a two-compartment steel locker, one side of which is equipped with wardrobe hooks, and the other side with suitable shelves which hold twenty-four white uniforms for the matron. It is of interest to note, also, that the hot and cold water connections for the wash-bowl are operated by foot pedals for the convenience of the surgeon whose hands must frequently be occupied with other matters. Also, the drain from the bowl, which normally stands open, can also be closed by a foot pedal and instantly released by removing the foot.



THE OPERATING OR FIRST AID ROOM.

The equipment of the operating room includes an operating table, an implement stand with a swinging basin, an electric sterilizer for instruments and bandages, a waste can with self-closing cover, a sanitary stool, a metal wash-stand with two sterilizing basins, a chair with suitable head-rest for simple operations or examinations, a sanitary closet for instruments and appliances, suitably equipped with glass shelves, and a rubber tired wheel stretcher for the convenient handling of injured persons. All this furniture and equipment, as well as that in the other rooms, is of the best white enameled metal, and was furnished by the Frank S. Betz Company of Hammond, Indiana.

At the time the photographs were made, the medicaments and surgical instruments had not been received, but were in transit from the Hammond, Ind., plant of the Betz Company, and the entire equipment was expected to be ready for use on February first.

It may also be well to mention in passing, that the instruments purchased, include a suitable microscope and other bacteriological apparatus for making the necessary tests for tuberculosis, typhoid fever, and other similar diseases so that the surgeon in charge can determine the exact physical condition of any individual employee. This health service and first aid service may be used without cost, not only by the operatives in the mills, but by any person in the whole mill village who may be in need of attention.

No arrangement has been made in connection with this health service equipment to care for a patient except for a limited period. However, the mill has a bed reserved at the Frances Berrien Hospital at Rome, which is only two or three miles distant, where serious cases may be removed quickly by the hospital ambulance, which is always to be had by telephone. All serious operations would be carried to this hospital rather than to attempt them in the operating room at the plant, which is intended, as has been indicated, solely for emergency work and bacteriological tests. The mill village has three doctors, and arrangements are made

whereby one is on duty at all times. Besides the surgeon in charge, a first-aid man in on duty in the mill whenever the mill is running.

The matron, to whom reference has been made previously, will be in her office in the health service building from 6 A. M. to 5:30 P. M. She will have complete charge of the female operatives, and any woman desiring to be absent from her work because of illness, will report to the matron first, and after explaining her disabilities, receive a release from the matron to her immediate department head, explaining that she is physically unsuited for work that day and must be excused.

While a first-aid room, in a small way, has long been maintained by this mill, Agent Meikleham believes that with the care of a matron for his female employees, and with the interest aroused in the better health service afforded by the present equipment, that a higher physical standard will be maintained, not only among the operatives of the mill, but throughout the village.

The Story of a Truck.

From the smallest state of the Union comes many records of successful motor truck operation but perhaps none is more successful than that of the one and one-half ton Federal truck owned by Le Bon Bleach & Dye Works of Pawtucket, Rhode Island. This particular truck is one of the very few on which the cost can be figured on what is known as the "full load" basis.

In the midst of a great manufacturing district, liberally supplied with producers of textile products, the Le Bon Bleach and Dye Works have found an excellent opportunity for the carrying on of their particular business. This business like many others is founded on service of a transportation nature. A successful pick-up and delivery system is absolutely essential.

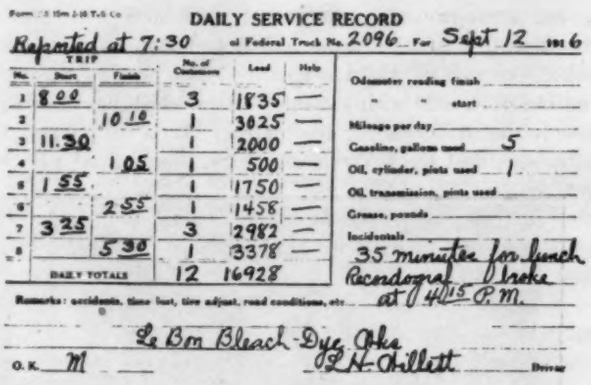
For a long time this firm depended on the co-operation of different express companies and their own horse units to keep up their reputation for quick deliveries. When trucks began to prove that they could give good and dependable service the Le Bon Company decided to try them out in their own business. They investigated the various makes of trucks then on the market and in the latter part of July, 1914, bought a one and one-half ton Federal.

The working schedule set for this truck included trips around Pawtucket during the forenoon of every Monday, Wednesday and Friday. In the afternoon of these days it made a trip to Fall River, a round trip distance of about 30 miles. On Tuesday, Thursday and Saturday of each week deliveries and collections are made in Pawtucket and Providence, and it is usual to have a capacity load going and coming at all times.

This last statement is the secret for economical transportation for any business. Unfortunately many forms of business cannot lay out a delivery schedule of this kind and this is the reason their unit costs appear so high. Always carrying a load is the ideal working condition.

The records reproduced on this page were secured through the use of the Recordograf and Daily Service Records, a sample of which is shown. The Recordograf makes it possible to locate every stop made during the day and the exact distance traveled between each stop.

The Daily Service Record shows in the "Start" column the time at which the truck left the plant and in the "Finish" column the time at which it returned. Opposite the starting time is shown the load carried and the customers served on the outgoing trip. The loads carried and the customers served on the return trips are shown opposite the finish time for each trip. From the Recordograf tape we can secure the standing time at each one of the deliveries. An analysis of the work of September 12th shows the following results:



DAILY SERVICE RECORD

Reported at 7:30 of Federal Truck No. 2096 For Sept 12 1916

No.	Start	Finish	No. of Customers	Load	Help
1	8 00		3	1835	—
2		10 10	1	3025	—
3	11.30		1	2000	—
4		1 05	1	500	—
5	1 55		1	1750	—
6		2 55	1	1458	—
7	3 25		3	2982	—
8		5 30	1	3378	—
	DAILY TOTALS		12	16928	

Odometer reading finish ____ start ____
Mileage per day ____
Gasoline, gallons used 5
Oil, cylinder, pints used 1
Oil, transmission, pints used ____
Grease, pounds ____
Incidentals 35 minutes for lunch
Recordograf broke at 4:15 P.M.

Remarks: accidents, time lost, tire adjust, road conditions, etc. ____

Le Bon Bleach Dye Wks
L H Willett Driver

O. K. M

Number of trips	4
Deliveries	12
Loads in pounds	16928
Ton-Miles	69.20
Standing time at plant	3 hrs. 11 min.
Standing time on deliveries	3 hrs. 19 min.
Total standing time	6 hrs. 30 min.
Running time	3 hrs. 3 min.
Miles traveled	32.75
Average trip distance	8.18
Gasoline consumed (gal.)	5
Miles per gallon	6.55
Pints of cylinder oil	1
Miles per pint	32.75
Cost per day	$5.88
Cost per ton	.69
Cost per ton-mile	.084
Cost per mile	.17

The importance of the position of driver for any truck doing this work cannot be emphasized too strongly.

L. H. Willett, the driver of this Federal has an important duty to perform and the record he has produced is evidence of his loyalty to his task. This statement taken from a recent letter received from the Le Bon Company shows the reputation which the Federal and the Federal's driver have made with this Company.

"We find that we are able to do much more work at a lower cost with the truck than we formerly did with the different express companies and our horse and team, and furthermore, our first truck paid for itself in less than nine months."

Did you ever consider what might be saved in the transportation end of your business?

"Health Service" and "Welfare Work"

BY G. D. CRAIN, JR.

It is not too much to say that one of the chief difficulties which has been experienced by cotton manufacturers and others in the establishment of facilities for the betterment of their employees, physically and otherwise, is the use of the phrase "welfare work" to describe such activities.

There is something about the term which calls up resentment. It suggests a kind of charity or philanthropy. It indicates that the work which is to be done is established out of the kindness of heart of the manufacturer, and because he desires to bestow a kind of largess upon his faithful workers. And it is only human nature that a feature of this kind fails to meet with a popular reception from those who have been trained to the idea of independence, and who resent the suggestion that they are being made the subjects of a new kind of charitable effort on the part of the mill-owner.

As the writer has pointed out in COTTON heretofore, such work is an advantage to the manufacturer, as well as to the employee; it pays for itself in the improved character of the work which can be produced and in the improved relationship between the hands and the mill. But these results cannot be accomplished if the provisions which the company makes are not received in the proper spirit by the employees, and if they refuse to take hold of them enthusiastically.

Of course, there are certain features of welfare work, to continue the term for the time being, which can be carried out in any plant. Physical examinations may be enforced by the manufacturer in the selection of his help, for instance; but the most important feature of such examinations is the periodical inspection of those already in the employ of the mill—not for the purpose of finding the unfit and discharging them, but to see that every person is doing the sort of work for which he or she is best fitted. It is impossible to carry out a system of re-examinations of employees unless the latter are favorable to them, and give their hearty co-operation. This can be and is secured when the matter is approached from the correct standpoint.

Accident prevention is an important feature of welfare work as it is generally understood, and accident prevention can be carried out by the manufacturer alone to the extent of having guards put on machines, belts and elevators, and posting warning signs and suggestive photographs; but the most important part of "safety first" is awakening the worker to a realization of his own responsibility for the safety of himself and others, and this emphasizes again that accident prevention cannot be carried forward in a thorough-going way unless the employee cooperates with the employer.

The fundamental theory of business is that the interests of manufacturer and worker, of capital and labor, are mutual; if this were not so, there could never be the progress which is being made today along industrial lines, but there would be continual warfare. Because it is realized that unless the manufacturer supplies a mill, raw material, machinery and the necessary capital with which to carry on the business, the worker cannot earn a livelihood, and because it is realized that everything that makes for the good of the plant or the good of the individual worker benefits everybody, the element of mutuality can actually be applied with a clear understanding of what it involves.

Looking at welfare work as it is generally constituted from this standpoint, and realizing that the effects of such work are mutually beneficial, it is at once realized that the term is a misnomer. If the employer shares the benefits conferred upon his employee, then to say "welfare work," referring only to the worker, shuts out the employer, and eliminates the idea of mutual interest. And it also puts the work in the wrong light before the employee. The thing to do is to put the whole system on a better basis by the creation of a descriptive which will more nearly and exactly describe the situation, and will appeal to the worker by suggesting the lines along which the efforts planned are to be carried out.

It is interesting to look around and see what other manufacturers are doing along the line of winning employees' cooperation by a carefully thought out description of the department. One of the largest employers of labor in the country refers to this feature of his organization as the "Sociological Department." The term can immediately be discarded as too cumbersome, and as unlikely to be understood by those in whose interest the work is conducted. Another big manufacturer does health and safety work through a "Mutual Interest Department," which is an excellent descriptive, putting in frank terms the attitude of the employer and making it clear that he expects to profit from his investment in health work for his employees.

"Employees' Service Department" is the way another manufacturer, who has a well-equipped emergency hospital, a whole-time physician, a graduate nurse and ample facilities for looking after sickness as well as accidents, describes his general efforts along this line, and this seems to be about the best kind of title for this class of work. One who does not like to accept charity will nevertheless receive a service, because a service is offered by a friend. There is no inequality involved, and the psychological effect of the use of this term is sure to be good.

In fact, a special section of the National Safety Council is now devoted to "Health Service," indicating that this big organization, which includes over 1400 manufacturers, regards these words as expressing in the best possible form the policy which should actuate employers who are making available medical and nursing facilities for injured men, as well as assisting in promoting the health of all employees and their families.

While this health work is a direct outgrowth of the safety first movement, it bids fair to become the larger part of the work, for the reason that the field within which it is possible to labor is so much greater. Safety first concerns itself with accident hazards in the mill, where the employee spends nine or ten hours a day; health work concerns him for twenty-four hours. Accident prevention concerns itself, of course, only with the individual employee; health service reaches out and touches the family as well.

Formerly manufacturers who had any considerable number of accident cases had an arrangement with a local doctor whereby the latter handled these cases at a fixed compensation. Then the idea grew of having the doctor devote more of his time to the company, and having office hours at the mill, where he could come in direct personal contact with the employees, both in cases of sickness and accident. So many manufacturers now employ physicians on a whole-time basis, and so many physicians are now devoting all of their time to the intensely interesting industrial field, where, without question, there is stimulation in the realization of accomplishment to be found nowhere else, that the American Association of Industrial Physicians and Surgeons, recently formed, already has hundreds of members in all parts of the country.

In some of the larger cities the work of providing medical and surgical facilities for large employers has been worked out on a very broad basis. In one case with which the writer is familiar, a successful physician has arranged to handle the work of more than fifty manufacturers, and has established several "first-aid stations" in the industrial district where these plants are located. This is probably not the ideal system, inasmuch as it does not sufficiently develop the personal factor, nor does it establish the service as a special company proposition; but from the standpoint of getting results at a minimum of expense—a feature which in many cases must be given much careful thought—it deserves consideration.

Reference is made above to the importance of having the company doctor, where employed on a definite part—or whole-time basis, come into personal contact with employees as much as possible. This feature deserves considerable emphasis. The employee who learns about health service work for the first time is likely to suspect the motives which are back of its establishment, and to regard those in active charge of the department without enthusiasm. Only as personal knowledge of the work being done is acquired will this first feeling of doubt and suspicion give way to a belief in the work and enthusiasm for those in charge of it.

One of the big features of employees' service which can be handled most effectively by the company doctor, especially after he has won the confidence of the workers, is a voluntary sick and accident association. An organization of this kind should supplement whatever compensation is provided under state law by giving those who are laid off either from sickness or because of injuries a sufficient amount to live on. When a system of this kind is instituted, with workers themselves as officers, though the company may exercise a general supervision over it and may collect the dues from the members, it provides for an economic need which otherwise cannot possibly be taken care of. Moreover, it can be made to fit into the situation either in a compensation or non-compensation state; and in view of the likelihood of the development of compulsory health legislation in the next few years, it will be a good thing for manufacturers to have made provision of this kind in advance of the enactment of a law.

Dr. Richard C. Cabot, of Boston, an eminent physician and an equally eminent writer, has recently said that while he believes in the future of work of this kind in the industries, he doubts whether it will prove itself from the economic standpoint as an advantage to the employer. Laying aside the immediate saving in restoring laborers to their work more quickly than would be possible otherwise, the single item of improved morale, the development of esprit de corps and the creation of a good understanding between the manufacturer and his hands, is worth all that it can cost.

Wool and Waste Spinning Experiments.

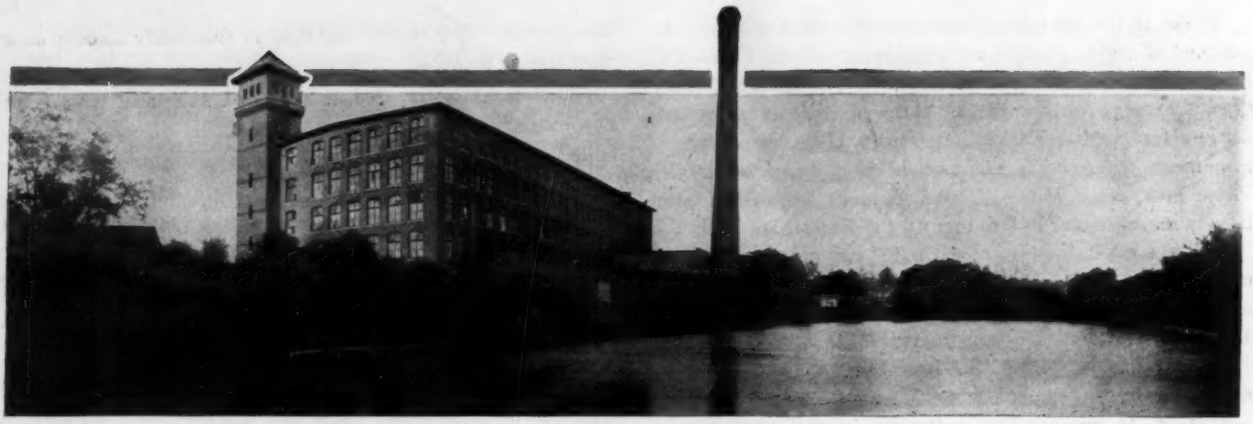
The many attempts made by domestic and foreign manufacturers to build a ring spinning frame for wool spun yarn which will increase the production of the spinning room, decrease the cost of manufacture and supply yarn of quality equal to or better than that spun on mules, have not been generally successful on account of the difficulties encountered in the construction of an efficient device for the appliance of a certain amount of twist to the roving while the drawing is done. As a result the trade has looked with more or less suspicion upon the ring spinning frame for such purposes.

It is said that this problem has been solved by Messrs. G. Josephy's Erbin, of Bielitz, who have equipped many woolen and cotton waste mills with their cards and ring spinning frames.

The American agents of this concern, the Lehnert Textile Machinery Company, 53 State Street, Boston, who have recently taken up the manufacture of Josephy carding and spinning machines in this country announce their intention of erecting at their plant in Lawrence, Mass., a Josephy Ring Spinning Frame (operated by an electric motor furnished by The Holtzer-Cabot Electric Company, Roxbury, Mass.) for the purpose of making spinning experiments on various classes of stock and yarn. The Lehnert Company invites parties who are interested in woolen ring spinning frames to send roving spools to them and study the Josephy ring spinning frame on their own work. The Josephy ring spinner is very successfully operated on woolen, cotton, cotton waste, asbestos and flax waste (American flax) yarns.

"Holt Roof Vent and Leader Connections" is the title of a booklet describing what is claimed to be the first and only leak-proof and trouble-proof device for connecting leaders and vents to roof surfaces. The need of an improved line of roof leader and vent connections has been apparent for some time, and the Holt connection, with its roof lock fittings and its very important expansion joint feature, is an ideal device, and it is claimed will absolutely prevent leaks around outlets due to the settling of the roof deck caused by shrinkage or settlement, or expansion and contraction in the leader lines, and in entirely eliminating sheet metal outlet boxes, it does away with the collapsing, condensation and leaks characteristic of that form of outlet. The Holt connection is made entirely of copper and cast iron, and is manufactured and sold by The Barrett Company, N. Y.

The Leon L. Wolf Paint Company, 304 Lincoln Inn Court, Cincinnati, Ohio, are sending to their customers and friends a wall panel calendar illustrating "A Little Dutch Girl."



Machines That Made Cotton King

BY DAVID D. PEETE.

Machine methods have figured more prominently in the evolution of the cotton industry than has any other one thing. Back in the days when the cotton seed was removed by hand labor, one person working steadily for two years could hardly have ginned more than a bale.

Eli Whitney's invention of the cotton gin in 1794 so speeded up this work that one machine will now turn out as many as fifteen bales in a single day.

Thus the gin brought about increased efficiency in the production of raw cotton, ably seconding a spinning machine invented by Sir Richard Arkwright in 1769, and greatly facilitating cotton manufacture.

After these two important inventions had opened the way for world-wide recognition of cotton culture and manufacture there followed thousands of adaptations and refinements in cotton machinery as the industry went forward with prodigious strides.

Arkwright's invention was contemporaneous with the steam engine; and this fact enhanced with effectiveness the spinning machinery. With the two great basic inventions for ginning and spinning, came a host of other machines for carding, drawing, slubbing, roving, spinning and doubling. And still the field of invention in the cotton industry enlarges. The tying-in machine is one of the recent revelations in time and labor saving devices. This machine ties the ends of the yarn on the old beam just before the beam is sent to the looms. The result has been a wonderful saving of time and labor. Formerly it required a whole day for an operator to tie up three or four beams, but under the new method a beam can be harnessed in from six to ten minutes.

Cotton manufacturing machinery having been first developed in England, it was only natural that cotton manufacture should first be developed in the same country. Gradually, however, the industry shifted to the New England states, and then, as a result of a general movement, cotton manufacture began to shift toward the states where the staple was raised.

Almost dramatic in its human interest is the story of the Atlanta Cotton Exposition in 1881 and the resulting establishment of the Exposition Cotton Mills, now located on the site of the old exposition grounds in the outskirts of the Georgia capital.

Men interested in cotton were beginning to realize the great loss that cotton producing states were sustaining year by year in shipping raw cotton to eastern factories and losing all the by-products through the absence of machinery by which these cast-off materials might be utilized and turned into money.

Through the influence of certain Atlanta men the cotton exposition, which was the first big show of its kind following the Centennial in 1876 to attract more than local attention, was made possible. Many prominent Georgians subscribed to a fund from which the exposition was financed. The result was a great awakening throughout the South in the matter of cotton manufacture. Today approximately half of the cotton mills of the United States are located in the cotton belt itself.

Even before the big Atlanta exposition had drawn to a close, a joint stock company had been formed and an

ALLEN F. JOHNSON, PRESIDENT OF THE EXPOSITION COTTON MILLS.

offer had been made for the buildings in the exposition grounds. These buildings had been located adjacent to a cotton plantation, from which the raw cotton was taken directly to the mills. Thousands of people flocked from all over the South to see the process carried on. Today the site is that of the Exposition Cotton Mills.

Three of the men responsible for the success of the exposition of 1881, who are alive today, are Hon. Edward C. Peters, vice president of the company; Col. Robert J. Lowry, and George W. Parrott, all three of whom are not only stockholders in the Exposition Cotton Mills Company but prominent in Atlanta commercial and financial affairs. These men, with Hugh T. and Samuel M. Inman, were largely instrumental in building up the Exposition Mills.

With a capitalization of $350,000 the mills were put in operation in 1883. A year later the first dividend was declared. Following that, the growth was so rapid that in 1895 the capitalization was increased to $500,000 and in 1915 to $700,000. Since the inception of the business 56 dividends have been paid to stockholders—all within a period of 31 years. The mill now operates 1,554 looms and 60,000 spindles. Its buildings have a combined floor area of 925,000 square feet. The mill property, including the 225 homes of the employees, covers 65 acres of land and is a model of construction. The newest building was an office building erected in 1916.

The present officers of the company are Allen F. Johnson, president; Edward C. Peters, vice-president, and P. E. Glenn, secretary and treasurer. Mr. Johnson is a very prominent figure in cotton circles in the South, and a very popular man personally among cotton manufacturers. He is past-president of the Cotton Manufacturers' Association, of Georgia, of which association Mr. Glenn is secretary and treasurer. Mr. Johnson is also a director and an officer of the Milstead Manufacturing Company, Milstead, Georgia; an officer in the Manchester Cotton Mills Company, Manchester, Georgia, and is also financially interested in other well known business enterprises.

In the manufacture of white goods, the only product manufactured by the Exposition Mills, the last word in machine equipment is employed. From start to finish the big mills are equipped with the most modern devices produced by the best brains of the industry. Another angle of the mechanical equipment of this concern is its machine shop and roller shop where tools and certain equipment are manufactured.

Then, in many other directions, efficiency of production and working conditions are improved by the use of modernized machinery and methods. This applies to the office as well as the producing end of the business.

In taking care of accounting work in connection with marketing the product of the Exposition Mills, figures compiled in the cloth room occupy a prominent position. In this department an adding and listing machine has been doing service for the last eleven years. Year after year this machine has been busy listing yardage, weekly, monthly and yearly totals, and printing the figures in duplicate.

In the office is an adding machine, equipped with an unlimited split device, a shuttle carriage, electric drive, and fractions, i. e., the fractions ¼, ½ and ¾—in such a way that they accumulate into whole numbers and become part of the total. The same arrangement, by the way, is incorporated in the construction of the machine used in the cloth room. This latter machine is commonly known as a cloth room machine.

This machine is used in some of the most important accounting steps in the Exposition Mills office, and a detailed account of its workings forms an interesting sidelight on the conduct of the company's accounting work. One of the first duties of this machine is making out the "cotton mixed" report, which is made up daily to show the amount and description of raw cotton consumed by the mill during that time.

The "cotton mixed" report shows in the first column the bale number, in the second column the weight of the bale, and in the third column the grade of cotton in that bale. Only the second column adds, as the machine is arranged for this work. The loose-leaf sheet on which the "cottom mixed" report is made is 6 by 11 inches, which is wide enough to accommodate six of these columns, or a double record of bale numbers, bale weights and cotton grades. When the day's consumption of raw cotton is totaled, the operator analyzes the various grades which shows at the foot of the third column, where the grades are referred to as 3's, 4's, etc.

CLOTH ROOM BOOKKEEPING.

In the cloth room the adding machine is set on a table immediately at the rear of the great wide-dialed scale that weighs the bales of finished cloth ready for shipment. Three people are concerned in weighing up the cloth, listing the yardage and making a book record of the figures.

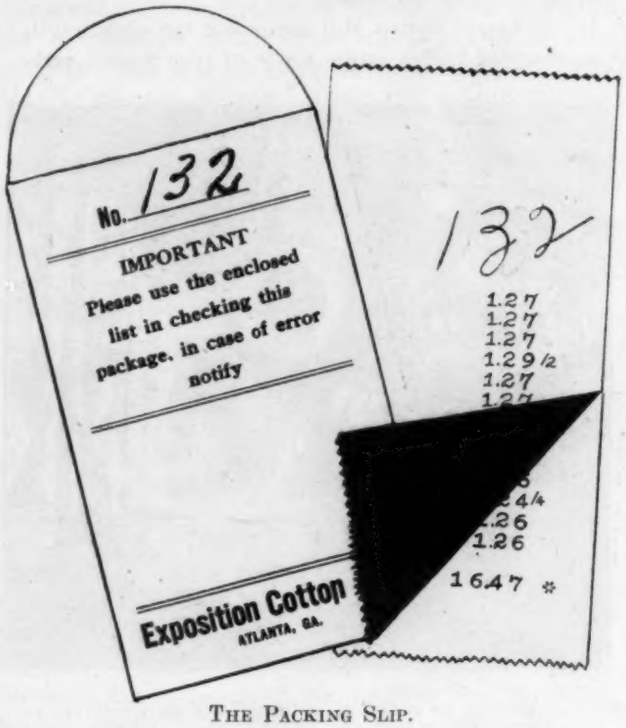
First, the truckman wheels enough bolts of cloth for a bale on the scale platform on a truck. He then calls out the yardage marked on the individual bolts. The foreman, who sits at the table, writes down the figures in his book, while the girl at the machine lists the figures. When all bolts for the bale have been called off and listed, the girl calls off the total yardage from the machine slip and the foreman writes the amount in his book, together with the total weight of the goods as shown on the scale dial.

The girl, on the other hand, writes the bale number on both the original and duplicate slips from the machine and places the carbon duplicate in a small envelope, which she hands to the truckman. He places it on the top of the first bolt of cloth and there it remains, being bound up with the bale to be used in checking when the bale is opened. The

original slip goes to the general office as a permanent record and a check against the foreman's record in his yardage book.

Two styles of invoices are made out in the Exposition office. One form is used when goods are shipped to a finishing house, or printing concern, to be finished for customers to whom the unfinished goods have been sold through an agent. In this case, the invoice goes direct to the commission house, duplicate copies also going to the finishing concern and to the files of the cotton mill office. A second form of invoice is the one which is sent direct to a customer for goods not shipped to a finishing concern. These are also made out on an adding machine to secure absolute accuracy and to save time, in either case the figures in only two columns accumulate, those being yardage and bale weights.

With the total bale weight at the bottom of the column, and the price per pound, the bookkeeper performs the multiplication and extends the amount of the total invoice at the right. The principal difference in the two forms of



THE PACKING SLIP.

invoice is the absence of price on the invoice sent to the selling agent. This invoice, in fact, is merely a memorandum of the shipment, it being understood that the commission man will re-bill the shipment to the customer.

After making out very comprehensive records of employees by number and departments, and tabulating their piece work for making up the pay roll at the end of the week, this data is then transferred in various combinations to a cost of production sheet; in other words, a form of labor analysis. This sheet shows a distribution of labor throughout the different departments of the mill and is a very important part of the production figures of the business, a very essential thing in the management of the mill.

In other words, office machines have done for the office force what Whitney's invention did for cotton ginning and what Arkwright's invention did for cotton spinning. Not only has the introduction of accounting by mechanical means lifted a great share of the burden ordinarily found in figure work, but, as in the mechanical processes of the mill, the speed at which such work is turned out has been accelerated, and a far greater amount of work made possible with the same expenditure of effort.

Nerve and Nerves.

It is a great thing to have nerve, but when one is afflicted with the plural of it, paradoxical as it may seem, it is the proper time to say, after a manner of speaking, "good night."

Both nerve and nerves are greatly misunderstood. Usually we think of the man who borrows our umbrella and fails to return it, as having nerve and of the fellow who jumps out of his shoes if some one slams a door as having nerves. These conceptions are superficial and out of perspective. The umbrella embezzler is only a genteel crook (provided of course he isn't absent minded) and the nervous fellow only needs sleep, fresh air and cold baths to put him right again. In regular order, there need be utilized only a police judge and a physician to apply the remedies.

But the man with real nerve is the strong souled individual who is not afraid of any being except his God.

The man with nerves may also be a strong souled individual, but the world bluffs him.

The man with nerves is often capable, well balanced, broad of vision and with an inner spirit for ruling men. In the privacy of his bedchamber he is able to plan big things, but when called upon to act he gets stage fright. Horror over adverse criticism, terror at the prospect of ridicule, even the fear of his job, get a strangle hold on this man and instead of being a fighter, he becomes a coward. The swift currents of business eddy him around into the quiet waters, where life is at least peaceful. As long as he is in no one's way, he shall not be hit.

It is an axiom that all men are born equal. The man with nerve is no better than the man with nerves, in fact he may not have as much natural talent, but he gets along because he is not afraid to back his judgment.

There are few of us who do not occasionally have to fight off the nerves. We are working amid constantly changing surroundings, new conditions and strange environment. The world is moving swiftly and we have many responsibilities.

But we can all go to school to ourselves and keep training up our nerve. We shouldn't let old man nerves get very close to us.

Don't be stubborn or foolhardy, but find out what you know to be right, and do it. Get the absolutely sane view of things and then speak out in meeting. The Devil himself can't hurt you for having nerve.—*The Right Way.*

The Stafford Company, of Readville, Mass., sent out to their customers and friends under date of December 20th, a new calendar pad for 1917, suitable for re-equipping the "Ideal Automatic Loom" calendar which they distributed about two years ago. Notification was also made that another stand could be secured upon request.

Gravity Does It.

To weigh automatically and to indicate the weight with unfailing accuracy, requires a mechanism of an unusual degree of perfection in design and construction. From early times, the inevitable function in weighing material, was to put on and take off loose weights and move poises back and forth on the scale levers until the load would balance the weight. It was not until recent years that scales were so adapted as to find the balance without the assistance of some outside or human aid.

Today the perfected Toledo mechanism makes the scales automatic, and the only power necessary to operate the entire moving mechanism, is the force exerted by the load on the platform—gravity.

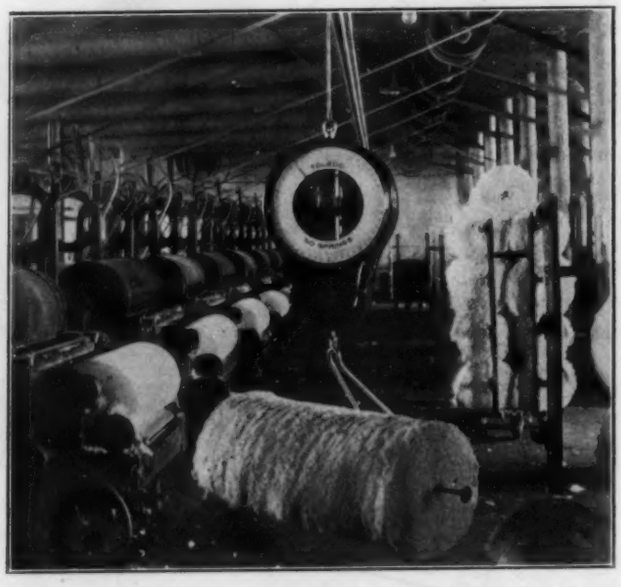
This force is passed along to the pendulum mechanism,

which performs, in the Toledo scales, the important function of automatically counter-balancing the load. Necessarily, to insure the positive, sensative and accurate operation, this mechanism is of very simple design and is constructed with the greatest precision and detail. The movement of the pendulum in counter-balancing the load is conveyed directly to the weight indicator by a rack and pinion, so mounted, and in such perfect engagement that all lost motion between the teeth is taken up, thus eliminating friction.

All Toledo scales are true gravity scales, incorporating the pendulum principle of construction. They are the product of an organization which has devoted itself exclusively for fifteen years to the development and manufacture of gravity automatic scales.

While the Toledo Company manufacture a full line of scales for all purposes, they make several products especially for textile work. The illustrations show the automatic springless lap scale manufactured for cotton mill picker rooms. One illustration shows the scale proper, in a close-up view, and the other illustration shows the same scale in the picker room of the Lanett Cotton Mills at West Point, Ga. These Toledo lap scales are built for speedy service and insure absolute accuracy at a glance. By means of the oil dash pot, the indicating hand is brought to a quick stop without oscillation. The visible double pendulum mechanism gives accurate weight whether the scale is swinging or out of level. The clear-figured dial is fourteen inches wide and protected by a dust-proof housing finished in durable black enamel. The galvanized scoop is designed for the weighing of laps, for skeins of yarn and for thread. Swivel connections are provided for both scale and scoop. Lifting this scale from its hanger automatically locks the weighing mechanism.

In the Lanett Cotton Mill equipment the scale travels on an overhead trolley before a row of nine finisher pick-



ers. As rapidly as each lap is turned out its weight is accurately recorded and the lap placed in its proper rack. In addition to the picker lap scale illustrated, the Toledo Company also manufacture for textile work a dormant scale for use in the cloth room where the invoicing of bales is being done, as well as at the cotton platform, in the warehouse, in the dye house, in the boiler room, and in many other places where absolutely accurate weighing will pay legal interest on the entire scale investment of the mill several times a year.

Full details of these textile scales may be secured by writing the Toledo Scale Co., Toledo, Ohio, or any one of their eighty branch offices and service stations, which are located throughout the country.

Paying your subscription to a trade paper helps some, but you must open it up and read to get all the benefits coming to you.

Mill Conditions and Market Reviews.

Southern Mill Situation.

Judging from the quality of COTTON's mail during the past month, the Christmas spirit was in full swing among the mills of the South during the season just passed. We regret very much that a lack of space will not permit the recording of the many festivities and good will offerings, stories of which were sent in to COTTON by its many friends. We wish to take this occasion to thank each and every one of our correspondents for furnishing this material to us, and to assure them that only the universal character of the Christmas celebrations and the great number sent in to us, prevents us making more than this brief mention.

Directors of the Fulton Bag & Cotton Mills at Atlanta, at a recent meeting, appropriated $50,000 to build a club house and recreation grounds at the mill, as the foundation for a community center. This will be located on a lot 400 x 400 feet near the mill plant, and already the property of the mill. It will consist of a baseball diamond, tennis court, basket ball court and a club house, equipped with an auditorium, shower baths and gymnasium, which will be conducted under the auspices of the industrial department of the Y. M. C. A. Work on the building will start as soon as the plans are drawn, and it will doubtless be completed by late summer or early fall.

An interesting gathering of the Osnaburg manufacturers was held at the Piedmont Hotel, Atlanta, on January the 8th. General business conditions and future prospects were discussed.

A report from Martinsville, Va., states that the Marshall Field Co., of Chicago, has purchased 1200 acres of land near there, on which a town will be built and a cotton and a knitting mill erected. Two railways connect with the site, the Norfolk & Western and the Danville & Western, furnishing excellent transportation facilities.

The Carolina Cotton and Woolen Mills Company have just made a contract with the J. M. Hopper Construction Company, of Leaksville, N. C., for the erection of twenty-five more houses on the Leaksville Mill Site, 20 houses between Leaksville and Spray, 15 houses at Spray near the Spray Woolen Mills and 35 houses at Draper.

J. H. Lane and Company, with general offices at 334 4th Avenue, New York City, have been appointed sole Selling Agents for the Exposition Cotton Mills of Atlanta, Ga.

The North Carolina Cotton Manufacturers' Association held a meeting at Raleigh, N. C., on Jan. 18th which was well attended. Among those present besides the officials of the Association were many of the leading textile manufacturers of the state.

A $20.000 school house is to be built at the Shawmut (Ala.) Cotton Mills.

One hundred new modern houses for operatives are to me added to the village of the Lanett Cotton Mills, West Point, Ga.

White & Company, of Chatham, Va., has the contract for the excavation work now being done on the Leaksville Mill site.

One of the interesting news items of the month is the report that the Cannon chain of cotton mills, with headquarters at Concord and Kannapolis, N. C., and employing over 4,000 operatives, are preparing to insure these operatives by what is known as group insurance. Each employee will be insured for a certain amount, to be paid at his or her death to whoever is named as the beneficiary. The amount carried will vary according to the length of time the person has been in the employ of the Cannon Mills. Each year this insurance will be increased by a certain stated sum until the maximum is reached. This insurance becomes void whenever the employee resigns his position. It is understood that this insurance scheme is conducted entirely at the expense of the mill.

A large number of Southern cotton mills granted bonuses to their employees either at Christmas time or at the first of the year. An example of this is the Jackson Fibre Company at Bemis, Tenn., where the bonus checks and gifts at Christmas time amounted to more than $21,000. This bonus was based on the number of consecutive years the operative had worked with the company. Those who had been in their employ ten years, receiving 20 per cent of the year's salary as a bonus. In addition to this, J. M. Bemis, the founter of the Bemis Bag Company, gave each employee a Christmas present of $5.00. All employees with families, were presented with turkeys and hams, 199 turkeys and 167 hams being distributed. The office employees and overseers of the firm were each given a check for 6 per cent of the year's salary.

The property of the Holt-Granite Manufacturing Co., at Haw River, N. C., was recently sold at public auction. J. R. Pasthal and W. Moore, of Richmond, Va., and F. L. Williamson, of Burlington, N. C., were the purchasers. Arrangements have been made for reorganizing and financing a company that will operate this property.

The new plant of the Broad River Mills at Blacksburg, S. C., started up the past month with 13,000 spindles and 250 automatic looms.

The American Spinning Company at Greenville, S. C., is changing their No. 2 mill from steam to electrive drive.

The waste house at the Lenoir (N. C.) Cotton Mills was recently damaged by fire to the amount of $1,200.

The Mills Manufacturing Co., at Greenville, S. C., are having much landscape gardening done at the mill and park. An Atlanta landscape engineer has charge of the work.

A dividend of 15 per cent was declared at the annual stockholders' meeting of Hampton (Ga.) Cotton Mills recently and the following directors were elected for the ensuing year: W. M. Harris, W. P. Wilson, H. G. Fields, J. L. Moore, B. F. Smith, C. V. Williams and B. J. Arnold. The directors met immediately after adjournment of stockholders' meeting and elected the following officers: W. M. Harris, president; W. P. Wilson, vice-president, and Manly Harris, secretary and treasurer.

The new warehouse for the Echota Cotton Mills, Calhoun, Ga., is 50 x 100 feet. Eight new bungalow cottages for operatives have also been erected.

Reports are current to the effect that the seventh cotton mill is to be started up at Cherryville, N. C., in the near future.

The new cotton mill at Gastonia, N. C., mention of which was made last month, will probably be known as the Smyre Manufacturing Co. The capital stock is placed at $200,000, all of which has been subscribed. It will contain 10,000 spindles and will manufacture fine yarns.

The Hickory (N. C.) Spinning Co., recently chartered by the Secretary of State for the manufacture of cotton yarn, is capitalized at $300,000, with $75,000 paid in. The factory building will be built just as soon as a suitable site is selected. All machinery has been purchased.

The Granite Falls Mfg. Co., at Granite Falls, N. C., have let a contract for the building of a new power dam. Work is to begin at once. The cordage plant of this company will be doubled in capacity.

A rumor is current that the Union Bleaching and Finishing Company of Greenville, S. C., propose to double the present size of its plant. If this is true, it will represent an outlay of approximately $300,000.

The Southern Utilization Co., of Charlotte, N. C., has organized and succeeds the Charlotte Cotton Fiber Co., manufacturer of cotton fibers for various purposes. Joseph M. Noonan, president, and Aubrey C. Lyons, secretary, both of Boston; William G. Beck is vice-president, and Ross B. Linton, treasurer, both of Philadelphia.

The Jackson Mills, Iva S. C., has completed a 90x60-foot clothroom addition and ordered 3360 spindles, 60 looms and other machinery. About $40,000 is the cost of the new building and equipment.

Plans and specifications have been completed by J. E. Sirrine of Greenville, S. C., for the mill which Summerfield Baldwin, Jr., of Baltimore will establish at Phoenix, Md. Buildings formerly used for cotton manufacturing are to be used, and the machinery will include 6336 ring spindles, 3840 twister spindles, electric drive.

The Perkins Manufacturing Co., Anniston, Ala., has been incorporated with $10,000 capital to manufacture cotton products, by R. E. Perkins, N. S. Perkins and A. E. Noble.

The Bibb Manufacturing Co., of Macon, Ga., has placed an order with the Gordon-Hay Co., Inc., for 60 Gordon double lickerin attachments for cards for their new mill at Porterdale. The order was placed through John Hill, of Atlanta, the Southern representative. The order also included a waste machine.

The residence of General Agent Joseph J. Bradley, of the Merrimack Manufacturing Co., Huntsville, Ala., was recently damaged by fire and water to the extent of $9,000. Full insurance was carried.

The new plant of the Blair Mills, Belton, S. C., is nearing completion and the new terry towel looms and spinning machinery are expected this month. Operations will probably be under way in all departments in sixty days.

The White Manufacturing Co., Kimesville, N. C., manufacturers of 14's single yarns, is contemplating the installation of 1,000 additional spindles at an early date.

A warehouse of the Cabarrus Mill, Kannapolis, N. C., was recently destroyed by fire, and a baler and several bales of cotton were destroyed. The financial loss was slight, as the building was small.

A. L. Shuford, of Conover, N. C., plans securing the establishment of a mill to manufacture turkish towels or some knitted product; has site and will erect suitable building for manufacturers who will locate.

The Cedartown Cotton & Export Co., Cedartown, Ga., is building a 48 x 78-foot packing room, which will relieve congestion in the main mill.

The Jackson Mills, Iva, S. C., confirm the recent report that 3,360 spindles have recently been added to the equipment, and advise that sixty 60-inch looms will be added about March 1.

The Fairfield Mill of the old Hampton Cotton Mills Company, located at Winnsboro, S. C., and which was taken over by the Lockwood-Greene interests at the time of the re-organization of the Hampton Cotton Mills Company is to be greatly changed in organization and product. 10,000 spindles will be added, making a total of approximately 35,000 spindles; a large picker building will be built and a three-story addition made to the main mill to accommodate the increased preparatory machinery which will be necessary in the manufacture of the new grade of product. A large warehouse will be built and a great deal of work done on the mill village. Approximately $1,000,000 will be spent in buildings and machinery.

New England Mill Situation.

After several weeks of quiet trade cotton manufacturers are inclined to take much more conservative views of the business outlook during the war period. There has been no decrease in producing costs except so far as the cotton decline indicates it, and so far as mills are concerned prices have held fairly steady. In the markets there has been a material easing in values on print cloths, some lines of convertibles, and here and there some extension of discounts on finished goods. Agents have been counselled in many instances not to press for further business on staples until the market settles, and a great deal of attention has been devoted to filling past orders. There are still a great many orders unfilled and some large contracts are booked and cannot be completed for many weeks.

The chief activity in the selling end of late has been in the offerings of cotton blankets, plain and fancy domets, fall ginghams, and fall dress cottons. Orders have been booked on many of these goods and as a whole the new fall season has opened auspiciously. In cotton blankets the business done was very large, in fact it was so quickly placed, that all lines of Nashua blankets were sold up and withdrawn from the markets in a day. Prices were on the highest levels ever asked. The market situation that was developed disclosed a very light stock held by jobbers. An interesting feature was the offerings from many export buyers, some of whom were ready to operate for long future delivery as domestic buyers have done for years.

For some time at least blankets will continue scarce as the season opened with some mills without stock goods of any kind and with unfilled contracts booked for delivery through the first quarter of the year. Owing to the sold up condition and the lack of warehouse stocks one large

corporation notified the trade that it could not supply more than 50 per cent of its normal output before October.

On domets, prices named were lower than competitors anticipated. Amoskeag lines showed advances over last year, ranging all the way from 35 to 60 per cent, and dark colors were advanced over lights, from ¾c to 1c a yard. These advances did not at first appear to be in keeping with the ratio of advances made on print cloths, and some other goods, but it was recalled that prices a year ago had been advanced above the ratio seen in gray cloths because of the added costs of dyes. Business came in very fast after the lines were opened this year and at this time everything points to a full sale of everything the larger producers will turn out.

It appears to have been the purpose of selling agents, whose goods had to be ordered from six months to nine months ahead of delivery, to name close prices and thus give buyers a measure of encouragement they needed. Based upon current cost of cotton, the mills will show a profit on napped goods and they will have the added advantage of being able to run in full during the summer. A great deal of business could have been accepted for export if agents cared to neglect the home trade. As matters stand, every possible effort will be made to meet the export call as it comes in.

The mills making dress ginghams have brought out lines for fall in a much larger way than last year. This means that the color scarcity is no longer in the famine stage except so far as price is concerned. Colors may be had if mills are willing to pay the high prices asked, and most of them are ready to pay, apparently. For fall, Red Seal zephyrs have been priced at 12½c; York seersuckers, 12½c, York dress ginghams, 12c; Silver Brook seersuckers, 12c. These prices are from ½c to 1c a yard up from recent spot prices on other goods of gingham construction. Buyers have been operating, to an extent that it was found necessary to withdraw lines of Toile du Nord, and Lancaster dress ginghams, the mills having taken all the business that can be handled.

While buyers were operating on napped cottons and fall dress ginghams a good business developed in staple ginghams. Expectations that the price on these cloths might be lowered did not materialize and it was found necessary for some large distributers to cover in their requirements. Mills in New England have been very careful about building up stocks of any kinds of colored yarn goods and it was found that there were no stocks of staples to draw on when jobbers' needs became more urgent. Consequently orders multiplied until in one quarter a single week's business ran into 3,000 cases, without any sort of pressure to sell being exerted.

Printers have been kept very busy and they still have a substantial sold to arrive list ahead of them. The volume of export business on prints and percales has been larger than ever before and domestic buyers have not been overloaded at any time. There has also been a good business on printed shirtings which has kept many machines well employed. In nearly all the bleacheries and print works there has been a shortage of unskilled labor to contend with and it has not been possible for some concerns to catch up with back orders and supply a normal spot business at the same time. For this reason, the continued quiet in buying circles has been welcomed by both printers and bleachers.

Bleached goods have been sold in some instances at the lower prices demanded by the sharp decline in print cloths. Many print cloths in wide constructions fell ½c to ¾c a yard from the top level of last year and bleachers selling unbranded goods were willing to accept business on the lower basis, being able to cover their gray cloth needs by purchases in second hands. These second hand offerings of print cloth yarn goods were large at one time but in the third week of the year there seemed to be a market broad enough to take care of what was coming out. Narrow cloths were weaker than wide cloths although fewer looms are now available for these goods.

On tickings, denims, colored duck, and working suit materials, the mills are still very well engaged ahead. The policy has been followed of making very few stock goods. A number of colored goods mills were able at one time last fall to sell yarns at great profits and they adopted the policy of selling yarns and stopping looms for which it was difficult to find weavers. Many of the gray goods mills, especially those engaged in fine yarn production, also accepted some very desirable orders for yarns. This policy eventually had the effect of weakening the attitude of many sale yarn spinners who had been asking abnormally profitable figures for merchandise regular customers sought. There is still a very satisfactory demand for certain kinds of yarns, especially those required in automobile work and all the yarn mills are busy.

Trade in fine combed yarn goods has not been especially active. Mills have been holding prices steady, and costs of converting are so high that many converters are undecided about their course for another season. Plain fine combed yarn goods fell off in price from ½c to ¾c a yard through sales made in second hands and while this decline had some influence with a few mills, the markets as a whole held quite steady. Advance sales of fine cottons for summer wear were ahead of last year and duplicate orders have been smaller than usual. At the same time there has been a good business done on many novelties, where mills were able to make them or finishers able to handle them. There has been no accumulation of fine gray goods at first hands and many of the mills still have business enough to keep them employed for many weeks.

The question of a future season, for which converters should now be preparing, is bound up with the course of the war and with peace negotiations, and it is in this quarter that the greatest conservatism is manifested. A great deal will depend upon the activity of sales at retail. Present indications are promising as the advance showings of fine and novelty fabrics have led to very satisfactory sales.

While "paper" cotton has undergone a great change in the past month or six weeks, the New England mills have found it difficult to secure actual cotton at anything like the concessions reported on the exchanges. Southern holders have been very stiff and offerings have been of a limited character. Transportation difficulties have been numerous both in cotton and in goods lines, and the readjustment in anticipation of the early spring business has gone along slowly. Manufacturers do not look for cheap cotton at any time before the next crop, and by cheap cotton they mean a level of around 16 cents a pound. If it comes they

will welcome it of course, but they are predicating no merchandise plans on such a possibility.

Mill machine shops continue as busy as they can be. The demand for automatic looms has been very large despite the recent advance of 20 per cent in the price. Other machinery advanced far beyond the parity of the advance in looms. Spinning is twice as high as it was before the war began, and carding machinery is up about 100 per cent. The demand is so general, despite the high price, that machinery men are able to pick and choose. There is very little desire shown to enter upon speculative mill building operations in any quarter and it is known that some enterprises have been checked by the unwillingness of investors at the machinery end to pass cash trade for stock business. Some of the older corporations have many plans in view for extensions but can hardly be expected to consummate them under present price conditions.

The general feeling among manufacturers as well as merchants is that it is a time to go slow and confine new enterprise to positive needs. There is a feeling that prices for merchandise were run up to too high levels and that there will be some sort of a readjustment when many spring orders are completed. There is also the uncertainty of cotton to be considered, one very common view being that a large acreage will be planted and talks of cheap cotton will become more general shortly.

Lancashire Notes.

BY AN ENGLISH CORRESPONDENT.

At the last meeting of the British Cotton Growing Association it was reported that the development of cotton-growing within the Empire had been discussed with the Colonial Office. It was stated that it had been pointed out that the cause of the inauguration of the association was the fact that Lancashire depended for three-quarters of her supply of raw material on America, and that, sooner or later, America would require most of her cotton for her own needs. The organization was established in order to discover whether the Empire could produce cotton suitable for Lancashire, and it claims to have proved that the Empire could produce all the cotton Lancashire requires both as regards quantity and quality. The association informed the Colonial Office that it had completed the experimental work and urged that it had laid a solid foundation on which it was possible to build up an enormous industry that would be of immense value both to Britain and the colonies. The difficulty of the association was, however, that it had not the means to undertake any further heavy responsibilities, and its view was that the time had arrived for the Government and the country to decide whether further developments were to take place. A conference of cotton trade organizations is being called to discuss the whole question.

John Kidger, of Oldham, has issued his annual review of the profits and dividends of the cotton-spinning concerns of that town and district. He gives details of 140 companies, and states that their dividends and bonuses for the year have averaged 13½ per cent and that the amount distributed is £389,528. The past year has been the best since 1913, and Mr. Kidger considers, that in view of the great increase in expenses and the decreased output, the result is fairly good. It is not much below any year since 1907. In several cases adverse balances have been reduced or cleared off in addition to paying dividends. The net profit of 100 limited companies which publish balance sheets is £400,470, and this works out to a percentage on their called-up capital of £3,502,755 or £11 10s. profit, as compared with a percentage loss of last year of 8s. 4d. Details of these hundred companies are given by Mr. Kidger as follows:

Total profits of 90 companies	£419,124
Less losses of 10 companies	18,645
Net profit	400,470
Total dividends	212,276
Credit balances in hands of 71 companies..	694,248
Debit balances in hands of 29 companies..	193,031
	£501,217

The average profit of these hundred companies was £4,004 in 1916 as against an average loss of £150 in the previous year. Of the past 33 years, 24 have been profitable. The aggregate profits have amounted to £7,462,333 and the losses on nine years to £921,864, leaving a net profit of £6,540,469. The average paid to shareholders during the 33 years works out to 5 2/5 per cent.

The Government has taken drastic action in connection with the dispute which threatened to lead to a strike of the card and blowing room operatives. All the workers had tendered notices and they were about to expire when the dispute was proclaimed as coming under Part 1 of the Munitions Act. This makes either a strike or a lock-out illegal, and compels the parties to submit their differences to arbitration. All strikers would be liable to a penalty of £5 per day for every day they were on strike and employers would be liable a similar penalty for every employee who was locked out. In the present dispute there is no question of a lock-out. As I explained in my last letter, the trouble has arisen owing to the Card and Blowing Room Amalgamation putting in a claim for advances of wages varying from 5 to 20 per cent for the different classes of operatives and the refusal of the employers to consider it. The employers' refusal was on account of the fact that under the arbitration award of June last, there was to be no change in wage rates until February, 1917.

Speaking at the annual meeting of the Manchester Cotton Association the retiring chairman, Charles W. Rye, said the total quantity of cotton landed at the Manchester docks last season of all descriptions amounted to 676,311 bales against 771,672 bales in the previous season. The American imports were 514,101 bales, against 620,487 bales, or a decrease of 106,386 bales. Nevertheless, this record indicates that Manchester's percentage of the imports of American cotton into Great Britain was 19.2 per cent against 15.4 per cent in 1914-1915, roughly a gain of 4 per cent. The total import of American cotton into Great Britain was one and a quarter million bales below the previous year. The Egyptian imports were 162,010 bales, against 149,426 bales in 1914-1915, or 12,584 bales more. Speaking of shipments from New Orleans, Mr. Rye said he was convinced that Manchester would greatly increase its importation of cotton from that port if shipowners would provide, as they did at Galveston, a more regular supply of

direct steamers, and make known beforehand the dates at which steamers would be on the berth.

Summing up the fortunes of the cotton trade during the second year of the war, Mr. Rye said there had been, on the whole, greater prosperity than had been reasonably thought possible under such exceptional conditions. There had been full employment for all cotton workers under conditions which, so far as superficial observation went, had not indicated privation or the necessity of any marked departure from their ordinary mode of life. In the spinning section the demand for yarn had continued almost fully equal to the supply. The increased cost of commodities and wages had resulted in an enormous increase in the cost of production. Nevertheless, the margin had been sufficient to allow of an average profit being made, while well-equipped, modern spinning concerns, whose circumstances had enabled them to maintain a comparatively full production of yarn, had done exceedingly well. Manufacturers, however, had not done so well, and their experiences had varied materially. On the whole, those manufacturers who had held their own might be said to have come out equal to the average. The Board of Trade figures for the ten months ending October, 1915, showed exports of cotton yarn as being 148½ million pounds, or ten and a quarter million less than last year; and the exports of cloth, 4,416 million yards, or 390 million yards more than last year.

The Yarn Market.

The close of the year in the yarn market, as well as the opening weeks of January, were as usual, at this time of year—slow. The holiday season, immediately followed by the inventory period, always tends to a dull market. Moreover, knitters and other yarn buyers were awaiting the affect of the waning cotton market in the hope that lower raw material prices would tend to somewhat reduce the high prices being asked for cotton yarn.

The demand for combed yarn was light, but prices held fairly well, and there were some lots of 20,000 to 25,000 pounds held at top prices, even during the dull period. For example, 40's two-ply skeins and warps were sold for 81 cents. There has been a gradual weakening in the demand for fine two-ply combed yarn, both in the gray and mercerized, and it is rumored that there will be a decline before long. However, the wish is probably father of the thought, and with the mills well booked on future business at good prices, declines are not to be anticipated in the near future.

Receipts of yarn from the South continue good, and in some instances, weavers have asked to have deliveries started ahead of the time specified in the contract. Carded yarns on cones showed a wide variation in prices quoted by Southern spinners. Some spinners who are well supplied with business were quoting on the basis of 38 cents for 10's. Other quotations ranged down to as low as 33 cents. As the month wore on buyers were not showing any disposition to buy heavily at the spinners high prices, but opinion was divided as to the probable action of the knitters. Some dealers were confident that knitters were fairly well covered, and would stay out of the market until prices declined, while other dealers were equally confident that knitters would not stay out of the market much longer.

The demand for combed yarns continued slow, especially for the two-ply yarn. The cost of two-ply yarn in 50's and finer, both lisle and mercerized, were so high that a considerable number of hosiery manufacturers have discontinued lines made from these yarns.

The demand for carded weaving yarn is light, and prices somewhat irregular. However, despite the light demand, Southern spinners quoted higher prices than was the case earlier in the month. There are a few dealers in the market who predict that prices will go higher than ever, before the end of February. They say they expect a good demand for practically all kinds of finished fabrics and that the manufacturers will be forced to cover on yarns regardless of prices. The conservative dealers admit that they were never as much at sea as they are at present. However, practically every one admits that the ultimate consumer is the one who is going to settle the question of prices. If the consumer readily absorbs the mill's product at the prices asked, there will be little tendency toward a decline.

Following are recent quotations in the Philadelphia market:

Southern Single Skeins.

8s	32½	10s	32½@33
12s	33½@34	14s	34 @34½
16s	35 @35½	16s	35 @35½
20s	37	24s	39 @39½
26s	40 @40½	30s	44 @44½

Southern Single Warps.

8s	32½@33	10s	33 @33½
12s	34 @34½	14s	34½
16s	35 @35½	20s	37 @37½
26s	40½@41	30s	44 @44½
40s	58 @59		

Carpet and Upholstery Yarns in Skeins.

8-4 slack	31½@32	9-4 slack	32 @32½
8-3-4 hard twist	29 @30		

Southern Two-Ply Skeins.

8s	33 @33½	10s	34 @34½
12s	34 @34½	14s	34½@35
16s	35 @35½	20s	37 @38
24s	40½@41	26s	41½@42
30s	43½@44	40s	58 @59
50s	70 @71	60s	79 @80

Southern Two-Ply Warps.

8s	33 @33½	10s	33 @33½
12s	34 @34½	14s	34½@35
16s	35½@36	20s	38 @38½
24s	41 @41½	30s	43½@44½
40s	58 @60	50s	70 @71

Northern Two-Ply Carded Peeler Skeins.

20s	41½@42	24s	42½@43
26s	43½@44	30s	46 @47
36s	51 @52	40s	61 @62
50s	72 @73		

Two-Ply Combed Peeler Skeins.

20s	42 @53	24s	56 @57
30s	63 @64	40s	77 @79
50s	90 @92	60s	98@1.00
70s	$1.10	80s	1.20@1.25

Southern Frame Spun Yarn on Cones.

8s	34 @34½	10s	34½@35½
12s	35 @36	14s	35½@36½
16s	36 @37	18s	36½@37½
20s	37 @38	22s	38 @39
24s	40 @40½	26s	41 @41½
30s	44½@45½	40s	58 @59
24s tying in	40	30s tying in	44 @44½

Northern Mule Spun Carded Peeler Yarn on Cones.

10s	37½@38	12s	38 @38½
14s	38½@39	16s	39 @39½
20s	40 @40½	24s	43 @43½
26s	44 @45	30s	49 @50
40s	60 @61		

Northern Mule Spun Combed Peeler Yarn on Cones.

10s	49 @49½	12s	49½ @50
14s	50 @50½	16s	50½ @51
20s	51½ @52	24s	52½ @53
26s	54 @55	30s	60 @62
36s	65 @66	40s	71 @72

Cotton Comment.

BY H. AND B. BEER.

New Orleans, January 20th, 1917.

After recovering about 2½ cents from the low level touched last month, the market lost nearly all of the advance as result of all efforts having failed to restore peace in Europe and the renewal of submarine activity. Nevertheless, Southern spot holders are not at all discouraged, feeling confident of higher prices eventually. Consequently there has been comparatively little cotton sold on the decline, as offerings remain light.

The demand for spots in the South the past month was not urgent, and sales were comparatively small, due to buyers limits being too low and holders refusing to make any concessions of importance. This condition is still in evidence, buyers and sellers being virtually apart.

Notwithstanding all the unfavorable shipping news, higher ocean freights and insurance, exports to Europe for past month show a comparative increase, now running on a basis for the season of about 7,200,000 vs 7,000,000 one month ago, shipments thus far this season amounting to 3,533,000 against 2,633,000 to even date last season.

Japan has been a constant buyer in the Southwest this season, whereas during the past six weeks Northern mills and Europe have bought sparingly. Thus far this season Japan has taken about 350,000 bales vs about 150,000 to corresponding date last year when the total season's takings by Japan were 500,000 bales, which gives some foundation to the report that the Orient will take about 1,000,000 bales this season.

Thus far this season Northern mills have taken 1,721,000 bales vs 1,715,000 to even date last season, Southern mills 2,789,000 against 2,253,000, European mills 3,043,000 compared with 3,313,000, making total by the world, 7,553,000 vs 7,281,000, or 272,000 bales more than last year when the season's total takings were 14,171,000 bales. In other words takings this season are running on a basis of 14,443,000, with indications of increasing.

As we have called attention in our previous reviews the total available supply in the United States outside of spinners' stocks this season is only about 14,000,000 bales, consisting of about 1,500,000 bales carried over at the opening of this season and this season's crop, including linters, of about 12,500,000 bales, and if exports continue to run as large as last year during balance of this season, there is likely to be a famine in cotton next summer.

During the month of December, American mills consumed 607,000 bales including linters vs. 632,000 last season, the smaller consumption last month than for December of last season being due to there having been five Sundays in December of this season vs. four Sundays in December of last season, otherwise the consumption, day for day, was as large as it was in December one year ago.

For the first five months of the season American mills consumed 3,100,000 bales including 336,000 bales of linters, against 2,899,000 for the corresponding period last season including 365,000 linters. Therefore it will be seen that American mills consumed 202,000 bales more than last year during the first five months of the season, and as American mills consumed about 7,300,000 bales last season, this season's consumption by American mills is running on a basis of 7,500,000, with prospects of increasing, due to their having been more active spindles operating at the close of December than at close of same month last year—32,864,000 vs. 31,746,000.

As to the outlook for the next crop, indications are that there will be an increase in the acreage, but probably not to the extent that current high prices would warrant, as the South is face to face with $2 wheat and $1 corn in Chicago, and will be obliged to raise large food crops. There is a deficiency of winter rainfall in Texas, a scarcity of fertilizer of quality owing to no potash from Germany, and the weevils cover a larger territory than ever before. All, of which makes for uncertainty as to the size of the next crop.

Southern manufacturers, who are now taking so much interest in the study of plant and garden development among their employees, will be interested to learn that Edward F. Bigelow, A. M. Ph.D. the head of the Agassiz Association at Arcadia, Sound Beach, Conn., is at present planning two lecture tours in the South. One of these will be between February 23rd and the first of April, while the other will be a later "summer school" trip. Any manufacturer desirous of having Dr. Bigelow include his town in this itinerary of the southern states, should take the matter up with him personally at as early a date as is convenient. It will be remembered that Dr. Bigelow is the author of the article "Have You Ever Seen Cotton?" which was published in the January, 1917, number of COTTON.

Lowinson's Comparative Cotton Goods Chart for 1916 is now ready for distribution. As usual, this is printed in two colors, the red figures showing advances in the prices and the black showing declines. Seven gray staple cotton cloths are shown thereon with corresponding prices for spot middling cotton. Anyone interested in cotton or cotton goods may receive one of these charts gratis by making application to Louis Lowinson, Cotton Goods Broker, 72 Leonard Street, New York City.

The Saco-Lowell Shops with executive offices at 77 Franklin Street, Boston, Mass., are sending out their 1917 calendar tablets, which contains a memorandum page for each week during the year 1917, conveniently arranged with spaces for each day of the week, and also with monthly calendars for the current, preceding and succeeding months at the top of each page.

COTTON MANUFACTURING.

A Comparison of Yarn Organizations for 22's Warp Yarn.

BY HENRY K. DICK.

The writer was led into making this comparison of methods of different mills making the same yarn by an incident which happened in a small mill. The mill had considerable trouble with their warp yarns breaking out in weaving and the weavers could not keep as many looms going as they were expected. The yarn was 21.3 and was spun from 2.08 hank roving, single roving in the creel. The actual draft was 10.24 but the mechanical draft as figured from the gearing was 11. Any spinner will admit this is an excessive draft for yarns spun from single roving. Another interesting point was, this same mill was making 2.35 hank roving which they spun into 16's and 19's filling yarns. The overseer of carding called the 2.08 hank roving, "warp roving" and the 2.35 H. R. was called the "filling roving." No fault was to be found with the filling yarns and it was the warp yarn only that had to be improved.

To improve the warp yarn, it was advised to make a finer hank roving and 2.75 H. R. was the size decided on. But to make this change it was going to cut down the production of the speeders making the original 2.08 H. R. 34 per cent. The superintendent on being informed of this, expressed his surprise. "Why should it make all this difference?" he asked. To make the matter clear to the superintendent the following explanation was given:

The speed of the front roll making 2.08 H. R. was 183 r.p.m. In changing to 2.75 H. R., we change the twist in the ratio of the square root of 2.08 to the square root of 2.75. The twist gear controls the speed of the front roll and the more twist the roving contains, the slower the front roll speed. Therefore the front roll speed will be in inverse ratio to the square roots of the hank rovings. From this calculation we get in a front roll speed of 159 for 2.75 H. R. The difference in front roll speeds would show a loss of 13 per cent.

There is another factor which has to be considered and that is the yards per pound. In 2.08 H. R. there are 840 $\times$ 2.08 = 1747 yards per pound. 2.75 H. .R contains 840 $\times$ 2.75 = 2310 yards per pound. Here we have the whole problem confronting us, we have a greater length to produce with a reduced front roll speed. We have already found that there are 1747 yards per pound of the 2.08 H. R., we also know that in changing to 2.75 H. R. there was a loss of 13 per cent due to the difference in front roll speeds. Deducting 13 per cent from 1747 we would have 1520 yards delivered of the new H. R. in the same time unit as when making the old H. R. or the front roll would have produced 1520/2310 part of a pound of 2.75 H. R. Expressing this value in per cent will give us 66 per cent which would be the relative production of the speeders changed from 2.08 H. R. to 2.75 H. R.

The change was not made because of the effect it would have on the production of roving for the spinning room.

My interest in the subject led me to make comparisons of other mills making the same yarn. Five different organizations were taken, the only data furnished to the writer is found in Table 1. In this table will be found the weights of the laps, slivers, the different hank rovings used in each mill. Without a record of speeds, productions or labor cost being furnished, an approximate value was taken for each item, using the same speeds and the same labor cost for each operation. It being assumed that each mill ran their pickers, their cards, their drawing frames, their slubbers, intermediates and fine frames at the same speed. This eliminated from the problem the variable factors of speed. This is where practically every mill will differ from another, some mills may run with higher and some with lower speeds than others. The same may be said of the labor cost, where there may be a different division of labor. With the elimination of variable speed and labor cost and using the same base for all five organizations, comparisons of considerable value are obtained.

By adopting this method, a comparative value was ob-

TABLE NO. 1.

MILL	LAP	CARD SLIVER	DRAW SLIVER	SLUBBER HANK ROV.	INTER. HANK ROV.	FINE HANK ROV.	YARN
1	12.5 OZ.	58 GR.	80 GR.	.40	1.00	3.12	22
2	12.5 OZ.	56 "	56 "	40	1.08	3.12	22
3	13.0 OZ.	55 "	62 "	.50	1.00	3.33	22
4	14.0 OZ.	65 "	60 "	.54	1.50	4.25	22
5	11.5 OZ.	52 "	66 "	.50	1.54	3.75	22

YARN ORGANIZATIONS 22'S WARP YARN

TABLE NO. 2.

	PICKING			CARDING			DRAWING		
MILL	LAP	PRODUCTION PER DAY	PROD. DAYS	WEIGHT SLIVER	PROD. PER DAY	PROD DAYS	WGT. SLIVER	PROD. PER DAY	PROD. DAYS
1	12.5	1780 LBS.	.56	58	150.8	6.62	80	210	4.76
2	12.5	1780 "	.56	56	145.6	6.85	56	147	6.80
3	13.0	1850 "	.54	62	161.1	7.82	62	163	6.13
4	14.0	2060 "	.48	60	156.0	6.41	60	158	6.33
5	11.5	1640 "	.70	66	171.6	5.81	66	174	5.75

COMPARISON OF PRODUCTION TIME UNITS

TABLE NO. 3.

	SLUBBER			INTERMEDIATE			FINE		
MILL	HANK ROVING	PROD. PER DAY	PROD. DAYS	HANK ROV.	PROD. PER DAY	PROD. DAYS	HANK ROVING	PROD. PER DAY	PROD. DAYS
1	.40	31.23	32	1.00	12.18	82.1	3.12	3.15	317.5
2	.40	31.23	32	1.08	11.25	88.9	3.12	3.15	317.5
3	.50	24.29	41.15	1.00	12.18	82.1	3.33	2.83	353
4	.54	23.20	43.1	1.50	7.22	138.5	4.25	2.24	446
5	.50	24.29	41.15	1.54	6.98	143.0	3.75	2.50	400

COMPARISON OF PRODUCTION TIME UNITS ROVING OPERATIONS

TABLE NO. 4

OPERATION	MILL 1	MILL 2	MILL 3	MILL 4	MILL 5
PICKING	.56	.56	.54	48	.70
CARDING	6.62	6.85	7.82	6.41	5.81
DRAWING	4.90	6.97	6.32	6.54	5.93
SLUBBER	32	32.	41.15	43.1	41.15
INTERMEDIATE	82.10	88.9	82.10	138.5	143
FINE	317.5	317.5	353	446	400.
TOTAL	443.68	452.78	490.93	641.03	559.59

COMPARISON OF PRODUCTION DAYS IN EACH ORGANIZATION

Graddick's Production Table No. 5

Production table for filling of hosiery yarn spinning, showing the pounds per day per spindle that can be produced on spinning machinery in Nos. and tenths of average Nos. from 32's to 70's at eleven hours per day. Allowance has been made for all necessary stoppage such as doffing, oiling, banding, cleaning, etc.

Yarn No.	Square Root No.	Twist per Inch	Front Roll Speed	Spindle Speed	Lbs. per da. Per spindle	Lbs. per day Per spindle No. & 10th	Lbs. per day Per spindle No. & 20th	Lbs. per day Per spindle No. & 30th	Lbs. per day Per spindle No. & 40th	Lbs. per day Per spindle No. & 50th	Lbs. per day Per spindle No. & 60th	Lbs. per day Per spindle No. & 70th	Lbs. per day Per spindle No. & 80th	Lbs. per day Per spindle No. & 90th
32	5.65	18.82	133.6	7900	.260	.2590	.2580	.2570	.2560	.2550	.2540	.2530	.2520	.2510
33	5.74	18.99	132.2	7900	.250	.2491	.2482	.2473	.2464	.2455	.2446	.2437	.2428	.2419
34	5.83	19.16	130.8	7900	.241	.2402	.2394	.2386	.2378	.2370	.2362	.2354	.2346	.2338
35	5.91	19.33	129.4	7900	.233	.2322	.2314	.2306	.2298	.2290	.2282	.2274	.2266	.2258
36	6.00	19.50	128.1	7900	.225	.2242	.2234	.2226	.2218	.2210	.2202	.2194	.2186	.2178
37	6.08	19.75	126.8	7900	.217	.2162	.2154	.2146	.2138	.2130	.2122	.2114	.2106	.2098
38	6.16	20.00	125.5	7900	.209	.2083	.2076	.2069	.2062	.2055	.2048	.2041	.2034	.2027
39	6.24	20.25	124.2	7900	.202	.2013	.2006	.1999	.1992	.1985	.1978	.1971	.1964	.1957
40	6.32	20.50	122.9	7900	.195	.1943	.1936	.1929	.1922	.1915	.1908	.1901	.1894	.1887
41	6.40	20.75	121.6	7900	.188	.1873	.1866	.1859	.1852	.1845	.1838	.1831	.1824	.1817
42	6.48	21.00	120.3	7900	.181	.1804	.1798	.1792	.1786	.1780	.1774	.1768	.1762	.1756
43	6.55	21.25	119.0	7900	.175	.1745	.1740	.1735	.1730	.1725	.1720	.1715	.1710	.1705
44	6.63	21.50	117.7	7900	.170	.1695	.1690	.1685	.1680	.1675	.1670	.1665	.1660	.1655
45	6.70	21.75	116.4	7900	.165	.1645	.1640	.1635	.1630	.1625	.1620	.1615	.1610	.1605
46	6.78	22.00	115.1	7900	.160	.1595	.1590	.1585	.1580	.1575	.1570	.1565	.1560	.1555
47	6.85	22.25	113.8	7900	.155	.1545	.1540	.1535	.1530	.1525	.1520	.1515	.1510	.1505
48	6.92	22.50	112.5	7900	.150	.1496	.1492	.1488	.1484	.1480	.1476	.1472	.1468	.1464
49	7.00	22.75	111.2	7900	.146	.1456	.1452	.1448	.1444	.1440	.1436	.1432	.1428	.1424
50	7.07	23.00	109 9	7900	.142	.1416	.1412	.1408	.1404	.1400	.1396	.1392	.1388	.1384
51	7.14	23.19	108.6	7800	.138	.1376	.1372	.1368	.1364	.1360	.1356	.1352	.1348	.1344
52	7.21	23.38	107.3	7800	.134	.1336	.1332	.1328	.1324	.1320	.1316	.1312	.1308	.1304
53	7.28	23 57	106.0	7800	.130	.1296	.1292	.1288	.1284	.1280	.1276	.1272	.1268	.1264
54	7.34	23.76	104.7	7800	.126	.1256	.1252	.1248	.1244	.1240	.1236	.1232	.1228	.1224
55	7.41	23.95	103.4	7800	.122	.1217	.1214	.1211	.1208	.1205	.1202	.1199	.1196	.1193
56	7.48	24.14	102 6	7800	.119	.1187	.1184	.1181	.1178	.1175	.1172	.1169	.1166	.1163
57	7.54	24.33	101.8	7800	.116	.1157	.1154	.1151	.1148	.1145	.1142	.1139	.1136	.1133
58	7.61	24.52	101.0	7800	.113	.1127	.1124	.1121	.1118	.1115	.1112	.1109	.1106	.1103
59	7.68	24.71	100.2	7800	.110	.1097	.1094	.1091	.1088	.1085	.1082	.1079	.1076	.1073
60	7.74	24.90	99.4	7800	.107	.1067	.1064	.1061	.1058	.1055	.1052	.1049	.1046	.1043
61	7.81	25.09	98.7	7800	.104	.1038	.1036	.1034	.1032	.1030	.1028	.1026	.1024	.1022
62	7.87	25.28	98 0	7800	.102	.1018	.1016	.1014	.1012	.1010	.1008	.1006	.1004	.1002
63	7.93	25.47	97.3	7800	.100	.0998	.0996	.0994	.0992	.0990	.0988	.0986	.0984	.0982
64	8.00	25.66	96.6	7800	.098	.0978	.0976	.0974	.0972	.0970	.0968	.0966	.0964	.0962
65	8.06	25.85	95.9	7800	.096	.0958	.0956	.0954	.0952	.0950	.0948	.0946	.0944	.0942
66	8.12	26.04	95.2	7800	.094	.0938	.0936	.0934	.0932	.0930	.0928	.0926	.0924	.0922
67	8.18	26.23	94.5	7800	.092	.0918	.0916	.0914	.0912	.0910	.0908	.0906	.0904	.0902
68	8.24	26.42	93 8	7800	.090	.0898	.0896	.0894	.0892	.0890	.0888	.0886	.0884	.0882
69	8.30	26.61	93.1	7800	.088	.0878	.0876	.0874	.0872	.0870	.0868	.0866	.0864	.0862
70	8.36	26.80	92.4	7800	.086	.0858	.0856	.0854	.0852	.0850	.0848	.0846	.0844	.0842

To find the production of an average No. read to the intersection of the No. nearest to the 10th, 20th, 30th, 40th, 50th, 60th, 70th, 80th, or 90th.

tained of the labor cost per pound of yarn for each mill. In obtaining the production days required at each operation (tables 2-3-4) a standard production of 1000 pounds was taken. The production per day per machine, delivery, or spindle divided into 1000 gave the number of production days required. The production days obtained in this way, calculated for each operation, gave the comparative time necessary in each method. In Table 4, Mill No. 1 has the shortest method of making this yarn while Mill No. 4 has the longest method. This difference in time is due to the fact that finer rovings are made in Mill No. 4.

The cost per machine day was found by the following method: Total weekly pay roll (carding) ÷ number of cards × 6 days = cost per card day.

Having found the cost per machine day, the following equation was used to find the cost per pound: Cost per machine day ÷ production per day = cost per pound.

The costs per pound given in Table 5 were found by the method described. These costs are given for compari-

TABLE NO 5

OPERATION	COST PER MACHINE HOUR	COST PER POUND				
		MILL-1	MILL-2	MILL-3	MILL-4	MILL-5
PICKING	124.00	0.06945	0.06945	0.06695	0.05950	0.08680
CARDING	10.42	0.06888	0.07138	0.08148	0.06679	0.06053
DRAWING	13.50	0.06614	0.09409	0.08531	0.08828	0.08006
SLUBBER	1 87	0.05983	0.05983	0.07694	0.08060	0.07694
INTER-MEDIATE	.969	0.07954	0.08614	0.07954	0.13420	0.13850
FINE	.823	0.26130	0.26130	0.29060	0.36700	0.32920
SPINNING		1.30000	1.30000	1.30000	1.30000	1.30000
	TOTAL	1.905	1.942	1.980	2.096	2.071

COMPARISON OF LABOR COST

son of organizations and should not be confused with costs which could have been compiled, if all the details of operation had been known. The costs will appear low to some mill men and again they may appear high for other mills. In one mill where the costs were carefully analyzed, the labor cost per pound for 22's was 3.272 cents.

Each of the five mills compared had a different organization but produced the same product. Hence the reason of the comparison, to show where economies might be affected to lower the cost of manufacturing.

The Smith & Furbush Machine Co., Philadelphia, Pa., are sending out a wall calendar approximately 16 x 24 inches. The upper part of each of the twelve sheets of this calendar which is not occupied by the calendar proper, is devoted to illustrating and describing different machines which are manufactured by this company for working cotton waste and other material.

The Curtis & Marble Machine Co., Worcester, Mass., manufacturers of cloth finishing machinery for cotton, wool, worsted and felt goods, carpets, rugs, plushes, velvets, etc., are sending to the trade a wall panel calendar for 1917 that is a practical duplication of their usual business-like annual offering. Any cloth room overseer who has not received a calendar this year, should write and request one.

Evener Motions on Pickers.

BY GEORGE S. BROWN.

A lap as taken from the breaker picker is formed of a fairly even sheet of cotton and by doubling four of them on the intermediate picker, the resulting lap is a great improvement over the breaker lap. Doubling four of these intermediate laps on the finisher picker produces a lap of much more uniform weight per yard than on the previous machines.

Some mills do not use the intermediate picker, but whether or not it is used, after the lap is formed on the breaker picker, the evenness of the next lap produced on the following machine should be governed not only by the doubling on the feed apron, but also by the use of a suitable and correctly adjusted evener motion to take care of the thick and thin places in the sheet of cotton passing to the beater. If an intermediate picker is used, it should be equipped with an evener motion; likewise the finisher picker. Successful carding depends a great deal upon the evenness of the laps, and laps cannot be too quickly brought to a uniform weight in their passage through the picker room.

Frequently evener motions are neglected, and more frequently are they used to take the place of a change in the picker draft gear. It should be firmly located in the mind that the evener motion is merely to take care of the thick and thin places in the feed. Only very slight variations in the weight of laps should be corrected by the evener adjustment. If for some cause or other, the weight of a delivered lap is too heavy or too light and a considerable change is to be made, the draft gear on the picker should always be changed.

With four laps of average weight on the feed apron, the evener belt should be in the center of the cones. If it is running way up to one end or down to the other, it is wrong. If the belt is down at the small end of the driven cone, it can be brought to the center where it belongs, by either feeding heavier laps to the beater or reducing the draft on the picker. If the belt is up on the large end of the driven cone, it can be remedied by either feeding lighter laps or increasing the draft.

The reason that the belt should run at the center of the cones is that it is then in a position to take care of any change occurring in the feed. If the feed comes heavy or light, the belt is free to move in either direction to reduce or increase the speed of the feed rolls. However, if the belt does not run in the center of the cones when the feed is normal, be sure that it errs in the right direction. By this is meant, that the chances of a large decrease in feed are much greater than an increase. A lap may run out on the apron thus reducing the feed 25 per cent, but an increase of 25 per cent in the weight fed is unlikely. From this it will be seen that if the belt tends to run slightly towards the large end of the driven cone, no fault should be found with the person in charge. If the belt tends to run towards the other end of the cone when four laps are up, this should be immediately corrected. The belt in this position could not take care of a considerable decrease in feed.

The thumb adjusting screw on an evener is to take care of slight changes in weight from day to day caused by weather conditions, slight differences in the cotton, etc.

Every lap taken from the finisher picker should be weighed and if found more than a half pound over or under the standard, it should be sent back and run over again. This means that a draft of four on the finisher picker is very satisfactory, because laps that are run over are the same weight practically as the regular ones being fed. This gives a feed steadily of the same thickness whether using intermediate or returned finisher laps, and the evener will always be working under the same conditions.

When it is found that the laps from the finisher are steadily coming a trifle heavy, this should be corrected by turning the adjusting screw on the evener to allow the belt to move a trifle toward the large end of the driven cone. The reverse operation is performed if laps are coming too light. The adjusting screw should not be used for any other purpose.

A neglected evener is worse than no evener at all. Every part of the evener mechanism should be frequently cleaned and oiled. To be of any use at all, the mechanism should be simple and very sensitive to changes in feed and so adjusted as to immediately respond by shifting the cone belt. A sluggish, stiff acting evener allows a thick or thin place to completely pass before the belt gets shifted, and in this way the evener only aggravates the difficulty by increasing the unevenness of the feed.

See that the linkage connecting the plates is correctly assembled and free to act easily and quickly. See that sufficient weight is applied to keep the plates pressing firmly against the cotton being fed on pickers which have two feed rolls besides the evener plates. If the plates are not pressing firmly against the cotton, they cannot easily and correctly detect unevenness. Where the beater strikes the cotton directly from the ends of the plates and one feed roll, trouble with insufficient pressure on the plates is not met with, as lack of pressure would allow the beater to "pluck" the cotton and an inferior lap would result which would call attention to the trouble.

Sand, leaf, broken seeds and bits of cotton get into the belt shifting device and cause the evener to stick. A new, stiff cone belt will frequently prove difficult for the shipper to move. These belts should be of flexible leather, regular cone belt stock, made endless if possible and kept free of oil, grease or caked cotton that might cause slippage and uneven feed.

On eveners where the linkage is underneath the apron, see that brooms, baskets, odd weights, etc., are not in contact with it and hindering its free operation.

The fact that an evener motion is working, does not always mean that it is working correctly. Many carders to test an evener, tear a piece of lap out of the feed and note if cone belt moves quickly. While this may seem all right, and while it shows that the evener is sensitive and apparently in working order, still it does not always mean that the cone belt is moved a correct distance to rectify the error in feed. For instance, if the feed becomes heavy and a two-inch movement of the cone belt is required to slow the feed to correct the weight, it is possible that the evener is hooked up so that the belt is moved 3 inches. In other words, the rod that operates the fulcrum lever on the rock shaft to which the quadrant is connected, is adjusted too close to the rock shaft bearing. By backing this lever off—which in reality makes the fulcrum lever longer—less movement is transmitted to the cone belt.

To test out an evener: Suppose we are doubling four 13 oz. laps and drawing four, with a resulting lap of 13 ozs. Cut one of the laps on the apron lengthwise and feed one half with the remaining three full weight laps. We have reduced our feed 12½ per cent and our resulting lap would be 12½ per cent light, or 11.375 oz. if there were no evener motion. After running the picker a short time with this light feed, then weigh a few yards of the finisher lap being made. If the evener is working correctly, the lap will be practically 13 oz. If the throw of the quadrant is too much, the lap will be heavier than 13 oz.; if too little, lighter than 13 oz. The remedy lies in lengthening or shortening the movement of the fulcrum lever attached to the rock shaft.

To get the very best results from pickers equipped with eveners, the tenders should operate the machines just as if there were no eveners on them at all to correct faults. Always keep four laps on the apron and don't let one run out, depending on the evener to make things right. Make good piecings and if there is a thick lump on the tail end of a lap running out, tear it off. Also bear in mind that if large quantities of waste are irregularly passed through the pickers, the eveners cannot maintain the correct weight. Waste should be evenly distributed in the mixing. Don't allow a box of soft waste to be brought from the carding room and dumped into the automatic feeder. If this is done, expect nothing but disastrous results. Eveners cannot regulate work of this kind.

Clothing Cards.

BY "CARDER."

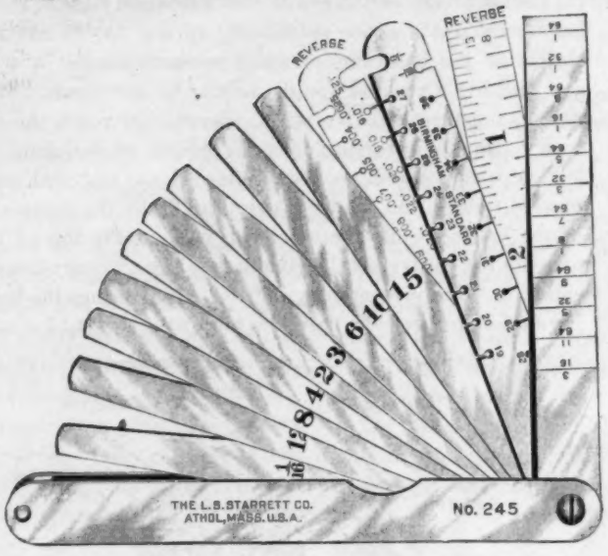
It is the intention of the writer to discuss this subject from a practical standpoint, derived from experiences in clothing cylinders and doffers. In the first place we must have the room where the work is going to be done at least 80 degrees F. It is best always to have the cylinder and doffer clothing opened up in the room some 12 to 24 hours before using it, as this will get the clothing at the same temperature as the room, and the stretch is more easily gotten out of the clothing. The clothing should be drawn on the cylinder and allowed to stand for 12 hours at least before tacking; then taken off and redrawn on and tacked for good. This allows a second stretching of the card clothing. All that is necessary is to cut the first taper for the first drawing on. When beginning the second drawing, cut the other tapers.

The rule I use for cutting tapers is as follows: For 50 inch cylinder, first split the cylinder fillets in half for 75 inches, there being 8 ribs of wires this will give 4 ribs cut out and 4 ribs left for 75 inches. Then measure off 4 bars, 18 inches in each bar and extract the wire in each bar down to the 18 inch mark. This being done and the clothing wound on, it will have met the 4 rib clothing coming around, at which place arrange to make a shoulder. This being done, drop over and cut out 4 more ribs of fillet, 18 inches each, thus tapering out.

Have two sturdy men turn the crank which is fastened to the cylinder. Do not allow them to jerk, or pull irregularly, as this will give irregular pressure on the clothing machine register. The pounds pressure for new cylinder fillets is for the first 4 ribs 160 pounds, and add 40 pounds

Special Cotton Mill Gauge Free—

for a few minutes of your time.



The taper gauge shows the thickness in 64ths to 1/16ths of an inch on one side, and on the reverse side is graduated as a rule three inches of its length, reading in 8ths and 16ths of an inch.

The wire gauge, English Standard, shows on one side sizes numbered from 19 to 36, with two extra slots, one 1/16, the other ⅛ on an inch, and on the other side shows the decimal equivalents expressed in thousandths. This gage has also 9 thickness or feeler gage leaves, approximately 4 inches long, of the following thicknesses: .002, .003, .004, .006, 008, 010, .012, .015 and 1/16th of an inch all folded within the case, which is 4¾ inches long, convenient to handle or to carry in the pocket.

Our Service Department desires the opinions of active mill men on the quality of the work shown in the advertising pages of this issue of COTTON.

We are, therefore, going to give this gauge for the best letter by a mill executive who gives the clearest and most definite reasons why, and in what maner, any certain advertisement is, in his opinion, the best.

Contestants must be mill executives, from overseers to presidents, connected with spinning, weaving, knitting, or finishing plants. The letter must be accompanied by the name, address and official position of the writer in order to be eligible, and must reach this office not later than the first of the month succeeding the date of issue.

The judges will be the Editor of COTTON and the Manager of the Service Department, whose decision will be final. The names of winning contestant will be announced in COTTON'S pages.

Address Contest Department of COTTON, Atlanta, Georgia.

for each rib as the clothing is wound on. Thus the 8 ribs will get 320 to 350 pounds pressure. Then hold this pressure all across the cylinder until tapering the tail end on the finishing of the clothing.

Clothing that is not drawn on temporarily and allowed to stand and stretch for 12 hours or more will have to be redrawn much sooner than if allowed to stretch. I have worked on cards where the clothing was drawn only one time, and put to work, and it soon became slack and could not be gauged up to a snug gauge. In redrawing slack clothing it should not be drawn on to its full limit. What I mean by full limit is, that if the clothing would originally stand 300 pounds pressure, don't give it any more than 250. I have tried both methods, and the ones I give 250 pounds lasted much longer and had more life in the clothing than the ones given the full limit. The full limit of pressure on old clothing causes it to become stale and dead and non-elastic. It made a dead, stiff foundation of wire. The foundation was too wide open and the teeth would swing back and forth and have no carding strength. I am using clothing now, which was put on and allowed to stretch before the final drawing-on and tacking, that has been in active work, carding about 150 pounds per day, or 900 pounds per week for 15 years, and is still doing first rate work, while the clothing that was redrawn is giving out, especially where it was pulled on with a high tension.

In preparing to redraw cylinder fillets as well as when putting them on new, I pull them on from the back of the card, as this saves much time as well as a lot of labor. In pulling them on from the front of the card the coiler head and the doffer cylinder have to be removed from in front of the card to place the clothing on the sides or framework of the card. Furthermore, a better and more regular tension may be obtained on the machine, and it appears to open up the clothing so that the stretch is more uniformly gotten out. In applying from the back of the card, all that has to be removed is the feed plate and lickerin.

After taking all the pains and exhausting all the skill in putting on the clothing, it can all be upset very quickly by improper work or some carelessness in the operator.

The clothing should be ground until it is smooth and the surface or the face of the clothing is as true as possible to insure good true settings and gaugings. The setting of the card working parts has been given so much that it is hardly necessary for me to give them. However, I will, in short, give a few points on setting. Beginning at the comb (doffer) blades. Set to 10/1000 of an inch at the nearest point of the comb blade to the doffer. Doffer to cylinder 7/1000 of an inch. Flats at front stand 10/1000 of an inch, tight. The remaining 4 stands should get slacker on each stand until the back stand is reached just over the lickerin. This should be a loose 10. Lickerin to cylinder 10/1000 tight. Feed plate to lickerin 10/1000 tight. Mote knives, back knife 17/1000 of an inch, front knife 15/1000 of an inch. Cylinder screen at lickerin 10/1000, 32/1000 of an inch at center and about ¼ of an inch next to the doffer. Have a good grade of oil for oiling with when starting to put the cotton through the machine. Non-fluid oil is, in my opinion, the best that can be used, for it will not fly out like a lighter oil, and once the oil gets in under the clothing at the edge of the cylinder, there is no getting it out and it will rot the clothing in a very short time. The clothing cannot be pieced like a belt, when it becomes bad in a certain place, for clothing must be smooth on the face and two

pieces of clothing of the same height of face are seldom found. Occasionally some can be used, but considerable grinding is necessary to get the clothing face of such parts smooth enough to set up to a good smooth gauge.

Watch the card stripping and don't let the cylinder fill up too heavy before stripping, as this will strain the clothing and cause it to lose its carding force.

Ordinarily, a card doing about 900 pounds per week on middling cotton with about a 12 ounce lap, making a 55 grain card sliver twice per day (of 10 hours) is sufficient providing they are stripped clean, when they are being stripped out and the cards are true to the gauge.

Loose flat settings (or gaugings) and loose setting of the doffer to the cylinder will cause them to fill up more readily and get the teeth on the clothing hot, making the cylinder choke down.

Chapman Spindle Improvements.

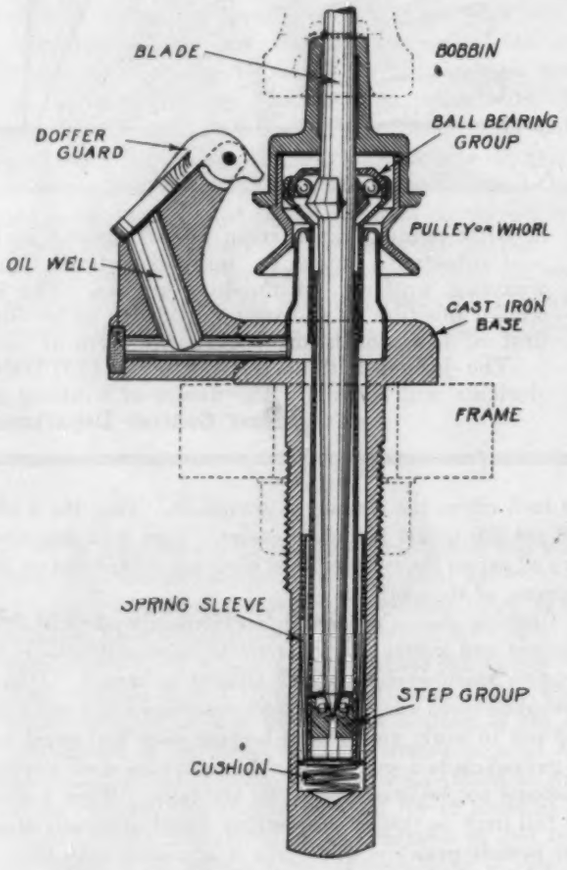
The same progress and improvement noted during the year 1916 in several other cotton machinery lines has also been in evidence in the ball bearing spinning spindle field. The manufacturers of the Chapman ball-bearing spindle, with more than five years' experience in the manufacture and installation of ball-bearing spindles for cotton spinning, are said to be showing due aggressiveness in studying operating conditions in the field and versatility in embodying such findings from time to time in improvements in design and refinements in construction. These changes have measurably enlarged the field for ball-bearing spinning spindles until it may now be said to include practically every cotton mill throughout the country, no matter what its character of work.

In making these improvements, the new company states that fundamental principles have not been disturbed, for these have proved through more than five years' mill experience to be correct and unchanging. But these improvements have developed a spindle with all the light-running, power-saving advantages of the most recent ball-bearing practice, and, in addition, greatly increased endurance—particularly under the conditions of longer traverse, larger ring, and coarser warp, toward which so many mills are swinging to meet the demand for greater production. And along with these improvements in design and construction, the company claims to have made equally marked changes in manufacturing methods, looking to the greatly increased production made necessary by rapidly increasing business.

The steady accumulation of these improvements, which, while not affecting fundamental principles, have yet served to modify considerably even the external appearance of the spindle, makes advisable the cross-sectional view of the present type here shown. Apparent at once are the lengthened blade and base, the businesslike crook of the oil well and doffer guard, the spiral spring at the bottom of the base to take up the shock of rough doffing, and the change in the location of the whorl.

No doubt a detailed description of these and other changes will be helpful to the mill man interested in spinning in enabling him to get a more definite conception of the value of these improvements. The base is longer than in earlier models by one and one-half inches, giving a greater distance between the bearings and therefore greater stability to the spinning part of the blade. This base is now made in a solid casting, with increased clearance between the bound of the doffer guard and the whorl base. There has been added a strong spiral steel spring, forced into the bottom of the base and pressing upwards against a steel disc, making a cushion for the bolster to rest upon. This spring, together with the spring sleeve, will resist the utmost roughness in forcing down the bobbin when doffing.

The spring sleeve has been shortened and stiffened, and, pressed tightly into the base, gripping firmly the lower end of the bolster, while the turned in neck at the top of the base fits the bolster closely, eliminating any tendency toward chucking. The present design of the bolster brings the bearing surface of the balls from the top of the cone to the mid-



A Sectional Drawing of the New Spindle.

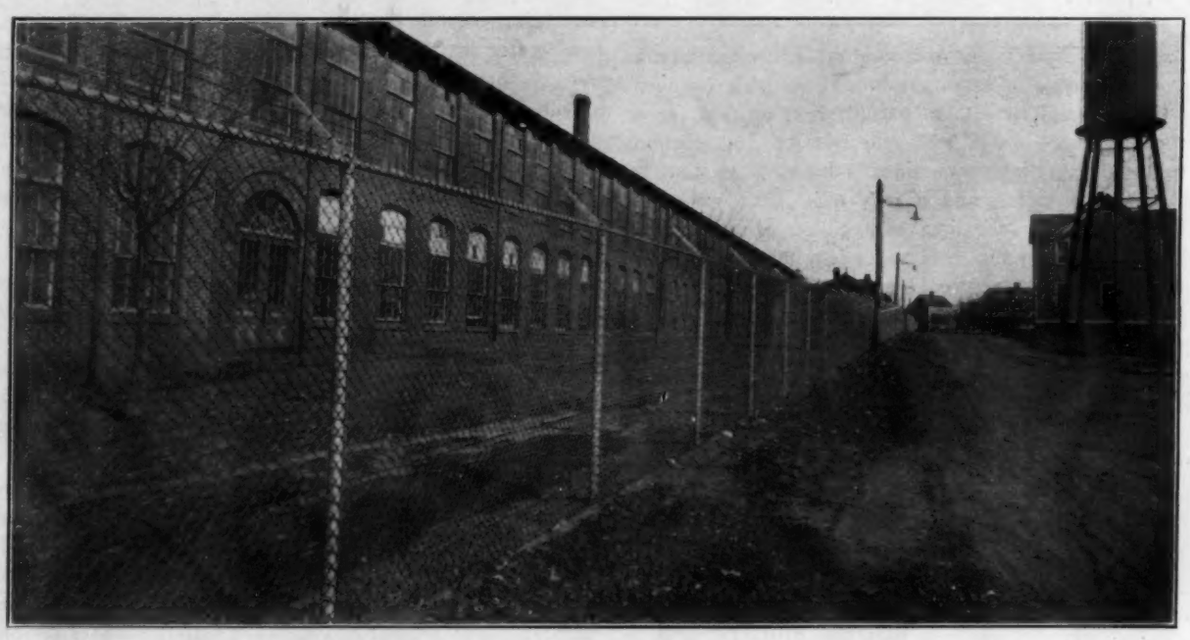
dle of the cone, where the shell is naturally thicker and more durable. This change is accomplished by increasing the diameter of the bolster cup. The bolster cups, which were formerly stamped from sheet steel, are now made of machine steel case hardened.

In conformity to approved ball-bearing practice, the design of the ball race in the cup has also been changed so that there is now a two-point contact for the balls instead of the former three-point contact. This change, together with the standard location of the bearing inside the whorl, which is relatively high on the blade, assures the virtual elimination of the annoying vibration unavoidable in the case of spindles where such bearing is located relatively lower on the blade.

The present type allows ample space below the whorl for the band, when reversing the twist; while the change in design at the bottom of the base, with the introduction

of the steel disc and spiral spring, makes it unnecessary to insert the bolster in one fixed position in order for the lock-clip to engage the step-bearing. Now the spring and disc take the place of lock-clip, and blade and bolster can be pressed down into the base rapidly and will come to rest without adjustment.

There are a number of other improvements which, however, are so minor as not easily to be indicated on a sectional view. The net result of all these improvements is to simplify construction, standardize manufacture, and provide a more durable design most closely meeting the needs of the average cotton mill today. The company states that these changes will not affect, except perhaps to increase, the saving of thirty per cent on the power to run the frame, and from five to fifteen per cent additional yardage, which the earlier models have been securing. The manufacturers, the Chapman Manufacturing Company, 185 Devonshire Street, Boston, invite correspondence regarding these improvements, as well as the general field and performance of ball-bearing spinning spindles in cotton mills.



Protecting the Property.

There are many points in the growing campaign of the sanitary and "safety first" reformers at which they unconsciously lend a hand to the cause of fire prevention. One of these is illustrated by the present war against the wooden fence around the plant, which not only is unsightly and unsatisfactory, but also inflamable, and does not do what it was intended that it should perform, viz., keep undesirable persons off the mill premises.

The accompanying illustration shows a view of the Equinox Cotton Mills at Anderson, S. C., and a portion of the Cyclone chain link property protection fence erected around this plant. This fence stands 84 inches high, and has the Cyclone invincible inside angle post tops, which carry three heavy barbed wires, offering an effective barrier against all attempts to climb over the fence. Besides, the top of the chain link fence itself is woven and twisted into heavy barbs which project above the top rail of the fence, offering additional protection.

The fabric used in this fence is heavily hot galvanized, using No. 9 gauge wire and woven into a close mesh of 1½ inches. The weave of this wire fabric is such that each strand of wire extends the full height of the fence and is woven into the next strand to form a double brace in each mesh. This fabric is woven like a large spring. The different links absorb shocks or strain, the tension being the same in all directions.

This property protection fence is fire-proof, wind-proof and weather-proof. The grounds and buildings receive ample protection and sanitary conditions are encouraged because the open mesh permits free access of fresh air and sunlight.

The list of staple supplies from which the textile manufacturer can draw is a long one. It is often a question what to choose from the multitude at his disposal. Years of experience, however, are bound to show him that there is one particular line of staples which always gives unfailingly good service. Once convinced of the dependability of a staple, the textile manufacturer thereafter, when ordering, merely does so by mention of the name of the article in question. Arabol products, carefully prepared for every branch of the textile industry by The Arabol Mfg. Co., 100 William St., New York City, are ordered in just such a manner by many manufacturers. They find it convenient to simply think of "Arabol" when getting in supplies.

Announcement has been made by the American Moistening Co., 120 Franklin St., Boston, Mass., that after February first, 1917, the address of their Southern office, which was formerly in the Healey Building, will be American Moistening Company, Empire Building, Atlanta, Ga. This change is called for by the retiring of John Hill as Southern Representative for this company.

Dyeing, Bleaching and Finishing.

The Lime Boil in Bleaching.

BY WILLIAM B. NANSON.

It is the alkaline property of lime which makes it such a valuable agent in many bleaching and dyeing operations. Possessing, as it does, properties analogous with soda, it differs from it in being much less soluble in water, which makes it, in many cases, much less energetic in its action and consequently much safer to use, but there are conditions, such as may arise from a high steam boiling pressure and consequent high temperature, which may cause it to act, especially as a saponifier, with much greater power than the more soluble alkalis, and it is to this energy of action under pressure that it owes its value as a bleaching agent, and which further indicates the advisability, or, rather, the necessity, of carrying out the lime boil in a high pressure kier.

A gallon of lime water will contain approximately a quarter of an ounce of lime in solution, and this strength cannot be increased by either concentration or heat, as a matter of fact, hot water will hold less lime in solution than cold water; reliable experiments have shown that it would require a gallon and a half of boiling water to hold in solution as much lime as a gallon of cold water would hold. The fact that cold water is a better solvent of lime than boiling water would seem to indicate that it should always be used cold, owing to the greater quantity of the material being held in solution, but this theory is not based upon scientific principles, for it is well known that heat imparts an energy to chemical actions which could not be equaled by ten times the quantity of the materials if used cold. As a matter of fact, it has been found that in boiling cotton goods with lime—when the pressure of the kier gets below 25 pounds, the boiling results have been imperfect.

When boiling cotton goods in an open kier without pressure it has been found that it requires the same length of time to saponify natural fats and oils with lime that it takes with caustic soda, but that it takes lime twice as long to saponify tallow and animal fats as it does caustic soda, but when cotton goods are boiled under pressure of over 25 pounds it takes caustic soda twice as long to saponify both the natural and animal fats and tallows as it does the lime. This indicates conclusively that high pressure kiers and a lime boil are the most efficacious, and that where the low pressure open kier is used the best results are probably obtained by the caustic soda boil. It is easy to infer from this that under the proper conditions lime is the most active saponifier, but that it must be used under pressure, and that low pressure kiers are inadmissible for the lime boil.

The relative merits of the lime or the caustic soda boil for cotton piece goods are but imperfectly understood by the average bleacher, and it has ever been a matter of some difficulty to make clear to him wherein the advantages of the lime boil lie; he has ever demurred to the extra time and processes involved by it, and he has ever been a rainbow-chaser for something quick and easy, that will run by itself and give no trouble.

There are, however, many experienced bleachers, among which the writer may be numbered, who are fully convinced of the superiority of the lime boil for cotton piece goods of a certain character, and a good bleacher should be able to distinguish when and how to vary his methods of procedure according to the nature and style of the goods under process on the one hand, and the subsequent treatment and finish for which they were designed on the other; for the merits of the lime boil or the caustic soda boil must be largely judged, not only by the subsequent style and finish of the goods, but by the means at hand at the bleacher's own plant to accomplish results. These means include the character and quantity of the water to be used, the adequacy of the washing, souring and chemicking and other appliances, and the type of kier employed. Water containing organic matters or bicarbonate of lime, i. e., hard water is injurious to the liming operation; in both cases the particles of lime in suspension become coated with a pellicle of insoluble matters, which prevents the access of the water to it and makes it unavailable; moreover, these matters will also, in their turn, fix their equivalent of fatty acids in the goods, which can hardly be removed by any subsequent souring or boiling operations. The lime boil should always be used where a thorough bottoming of the goods is required, or for goods that are to be dyed subsequently, or where a fine, silky, clean face is to be given in the finishing, as in silesias, percolines, schreiner finish, etc. Goods boiled in caustic soda will not finish down so fine, but will feel spongy, and it is extremely difficult to starch such goods into a stiff, hard, permanent finish.

I do not claim that the lime boil acts as a real cleansing agent; it simply prepares the goods for the subsequent operations. As a matter of fact, the goods are darker in color after the lime boil than they were before, but a great and important chemical and physical change has taken place in them, nevertheless. The saponifiable fats and waxes have become changed into calcium salts; these remain in the fiber, and there has become fixed upon the goods a greater percentage of calcium than the equivalent of the fat and wax content of the cloth. Whatever starch content the cloth may contain is hydrolyzed and removed in the souring operation, which is always necessary after the lime boil. The calcium salts or lime soap is decomposed in such a manner that the subsequent boiling in soda and washing thoroughly remove it.

There is left in the goods, if sulphuric acid has been used in the souring, about 3 to 5 per cent of sulphate or carbonate of lime. This adds to the weight of the goods and may be desirable if the goods are to be finished white; if, however, the goods are to be dyed, this insoluble lime salt would be objectionable, as it might cause cloudy colors and, therefore, it would be advisable to sour the goods that are for dyeing with hydrochloric acid or a mixture of hydrochloric and sulphuric acids, which would cause a soluble chloride of calcium salt to form on and in the

goods. This salt will easily wash out in the washing machine and give no further trouble.

Owing to the fact that many bleach-house proprietors object to the extra initial expense of installing high pressure kiers, and that a fairly good bleach *can* and *has* been obtained by a good single boil in caustic soda, which bleach seems to be giving satisfaction on many lines of goods; owing also to the fact that the souring operations which must follow the lime boil are necessary where caustic soda is used, and also that no calcium salts can be formed, except from the chloride of lime; many bleachers have turned their attention to the caustic soda boil, and each one has some mixture or process, or imaginary occult hocus pocus of his own that he is willing to stake his reputation on, but such bleachers can "take it from me," that nothing that they can invent, can achieve better, or as favorable results, either as regards quality or cost, as the high pressure lime boil and plenty of time, unless, of course, the goods are for a special finish, as cotton flannels, Turkish towels, some of the styles of quilts used and other special lines.

There are many objections to the caustic soda boil. In the first place, many styles of goods will finish too soft and spongy from a soda boil; in the next place, there is much more danger of tender goods, i. e., the formation of oxycellulose.

Then, again, when goods are boiled with caustic soda a thorough circulation of the liquor is absolutely necessary and must be maintained during the whole time of boiling, and if this is not done, it seldom can be perfect, the results are a bad kierful of imperfectly bleached goods. In the lime boil this circulation is of no importance, because the preliminary liming, i. e., the impregnation of the lime into the cloth in the liming machine, favors the setting-up of a number of local centers of chemical activity, for it must be remembered that when liming goods the lime is used in a milky state—that is, containing undissolved lime—and though it may be contrary to theory to suppose that undissolved lime is chemically active, there can be no doubt that, besides acting as a reserve for maintaining the saturation of the water with lime, the finely divided particles have an action which is not to be distinguished from what is considered purely chemical.

It is known that lime can disorganize vegetable fibers, and that some cases of tendering cloth during the bleaching process are attributable to the action of milk of lime, while it cannot be shown that clear lime water produces such effects. This clearly indicates the necessity of straining the milk of lime through a fine sieve, so as to prevent the entrance of any undissolved lumps of lime into the kier with the goods, as these lumps may cause tender spots and holes in the goods.

When goods are boiled in caustic soda, unless the goods are put through a solution of caustic soda into the kier, which is seldom done, the soda liquor percolates through the goods in the kier following of course all the lines of least resistance until the caustic becomes carbonated and loses its saponifying effect on the fats and oils, except in such lanes of circulation as permit of the early passage of the boiling lye, and what liquor does penetrate to the remotest parts of the kier remains stationary, and becoming carbonated by its contact with the goods is no longer capable of acting as a saponifier.

Exhaustive experiments have shown that the rate of saponification of the fats and oils is in the exact ratio of the velocity of the circulation of the soda lye. The liquor tends to become weaker where it is in contact with the goods, owing to the dissociation and carbonation of the caustic, and if the circulation is imperfect it is not quickly replaced by fresh liquor, and after a time the rate of saponification diminishes to such an extent that in spots the goods are insufficiently acted upon.

Further than all this, lime is much more economical to use than caustic soda at the present war prices.

I have said that the lime boil is not a cleansing process; it is merely a preparatory process to a subsequent finishing boil in soda ash. At this point it would be as well to remember that most manufactured cotton goods contain, besides cellulose, 1 to 5 per cent of oils, fats and waxes, 1 to 2 per cent of mineral matter and 4 to 8 per cent of nitrogeneous and other bodies, soluble in alakli. The oil very frequently includes quantities of the mineral oils used to lubricate the machinery during the various manufacturing processes. The matters soluble in alkali include practically all the natural oils and the protoplasmic contents of the cotton, together with the starch and other materials used in sizing. We have already said that bleaching consists in removing, as far as possible, the whole of these bodies and leaving the cellulose behind and all bleaching processes are based upon the chemical properties of the impurities and the inactivity of the cellulose.

Now, it would appear from the foregoing that all that would be necessary to thoroughly bleach a piece of cotton goods would be a boil in caustic alkali, followed by a short hypochlorite bath, followed by the usual souring and washings, but this is one of the theories sometimes taught in the schools that utterly fails in practice, for the reason that while the oils and fats are theoretically soluble in caustic alkalis, *they are not really so in practice,* being combined with the nitrogeneous or proteid matters in the cotton, and these proteid matters acting in the capacity of water-proofers, protect the oils and fats from the action of the alkalis used in the first boil. It has been found that in the first boil in lime or caustic soda only about 21 per cent of the fats and waxes are removed, but that about 92 per cent of the nitrogeneous or proteid matters are removed. These proteids are compounds containing about 15 to 18 per cent of nitrogen. They are known as albuminoids and are soluble in an alkaline solution. Prolonged boiling converts them into soluble peptones, which are easily removed from the goods by washing.

In the second boil in soda ash the cotton goods lose 44 per cent of fats and waxes and only 0.2 per cent of proteids. This shows conclusively that the main result obtained by the first boil in alkali is the removal of the proteid matters and not the fats and waxes, and that it is only after these proteid matters have been removed by the first boil that the alkali in the second boil becomes really effective. These results effectively dispose of the theory that one boil in caustic soda is all sufficient, and clearly indicate that a preliminary boil in either lime, or other caustic alkali, is absolutely essential to produce good bleaching, and for reasons which I have already given I prefer lime.

Lime (Ca O) is made by burning calcium carbonate or limestone in a kiln with coal, this causes the expulsion of the carbon dioxide thus:

$$Ca\,CO_3 - CO_2 = Ca\,O.$$

When exposed to the air it absorbs both carbon dioxide and

moisture, calcium hydrate and carbonate being formed. It has an alkaline reaction, and is a typical base. When a small quantity of water is poured upon it the combination with water is accompanied with the evolution of heat, causing part of the water to be converted into steam. This product is known as slacked lime, the original oxide being termed quick-lime. The slacking of lime is more rapid at high than at low temperatures. At ordinary temperatures 48 hours is often necessary, for it must be borne in on the mind of the bleacher that lime for boiling must be thoroughly slacked; any unslacked lumps or particles are capable of inflicting great damage. To slack lime rapidly it is necessary to use neither too little nor too much water. If too little is used, the lime will be only partially slacked and this will cake and protect the remainder from the action of the water. On the other hand, too much water lowers the temperature; this hinders the slacking and the mass does not readily powder as it slakes. The best plan is to put the lime, using enough to last a week or more, into a large shallow tank, with just enough water to wet it, and after twenty-four hours add sufficient water to convert it into a stiff paste. In this form it keeps well and may be dug out as required. When stored dry it rapidly absorbs carbonic acid from the air and becomes useless.

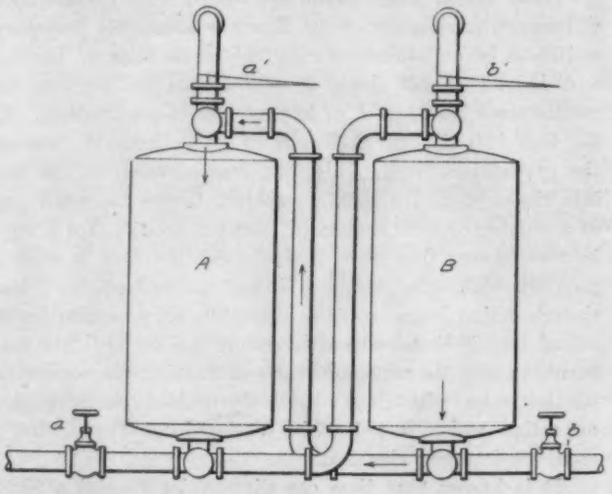
As regards the quantity of lime to be used, I would say that one pound of pure lime will convert about 10 to 11 pounds of oils and fats into lime soap. Now, if the goods contain 5 per cent of fat, which is the largest percentage, we have spoken of previously, a ton of goods would contain 100 pounds of fats and oils, and theoretically it would take 10 pounds of lime to saponify this amount. This, of course, is theory; practically it would take much more than this, because many factors intervene to make an increase of this quantity necessary—such as the purity of the lime, carbonating of the lime by contact with the goods during boiling, etc. Then, again, there will be some loss of lime caused when blowing the kier out preparatory to boiling, as we shall show later on; therefore, we would advise the use of at least 45 pounds of lime to each ton of goods, and this would give us an excess of lime that would cover all eventualities.

The lime, after being slacked and worked into a thick paste, as previously described, is shoveled into a mixing tank of 2 or 3 hundred gallons capacity, fitted with a mechanical agitator, enough lime being added to the tankful of water to make a rather heavy milk of lime. When thoroughly mixed this is run through a strainer into the water-box of a log roll washing machine. The goods are run through this into the kier.

There is considerable difficulty in wetting out cotton goods thoroughly in cold lime water and, therefore, it is always better to wet out and steep the goods overnight or longer, either in hot water or warm water, to which Diastofor has been added. There is another reason of much importance for doing this. Investigators have decided, and properly, too, that a bleach may be considered "good" when all, or mostly all, of the nitrogenous and ether-soluble substances have been removed from the fiber, and that these nitrogenous and ether-soluble substances can be broken down by bacteria and removed by washing more effectually than by the ordinary boiling processes, and if the time can be spared, bacteria may be profitably employed as an accessory, if not a substitute, for the present methods of purifying cloth preparatory to the actual bleaching with hypochlorites.

Now, while it is quite true that most of the impurities in cotton cloth that are removed by the boiling operations are of an organic nature, and might possibly be rendered soluble by an enzyme of an animal or vegetable origin; in other words, by heat and fermentation; the writer is not prepared to say that heat or fermentation will sufficiently bottom and cleanse the goods without any boiling at all, but one thing is most certain, and that is, that it is very valuable and economical adjunct to it and, therefore, I unhesitatingly advocate the steeping process previous to lime boiling, and to accomplish this I would run the goods through warm water of *not over* 60 degrees F., containing in solution 2 pounds of Diastofor to every 100 gallons, and allow them to lay overnight. This will break down the starch and induce fermentation and change most of the insoluble nitrogenous and ether-soluble substances into a soluble and more easily removable condition.

Almost any make of high pressure kier will answer for the lime boil, providing the pressure can be gotten to 25 pounds or over. The writer, however, has achieved the best results by using, at a pressure of 45 pounds a "twin" kier similar to that shown in the illustration. It will be noted, by following the arrow marks, that the the kiers are connected together by piping and that the bottom of kier B



is connected by a pipe with the top of kier A and the bottom of A with the top of B. One marked advantage of this twin style of kier is, that the goods can be run double through the liming machine and by dropping one end into each kier both kiers can be filled at once, thus doing the filling in half the time. They can both be emptied in the same manner through the washing machine. The kiers are usually built to hold 5 tons together, and are operated as follows: The valves ($a^1 - b^1$) are two-way valves, connected on the one hand with the main steam pipes and the bottom of the other kier on the other hand. The valves (a — b) are the let-off valves for blowing off and draining the kiers. After the goods have been run through the lime into the kiers the manhole lids are put on and securely fastened, and *all* valves are shut. The steam valve (a^1) and the let-off valve (a) are then opened and the steam blown through the kier A until it comes through the let-off valve (a) entirely free from air; both valves are then shut and as soon as the pressure has decreased sufficiently, 800 gallons of boiling water, which has been pre-

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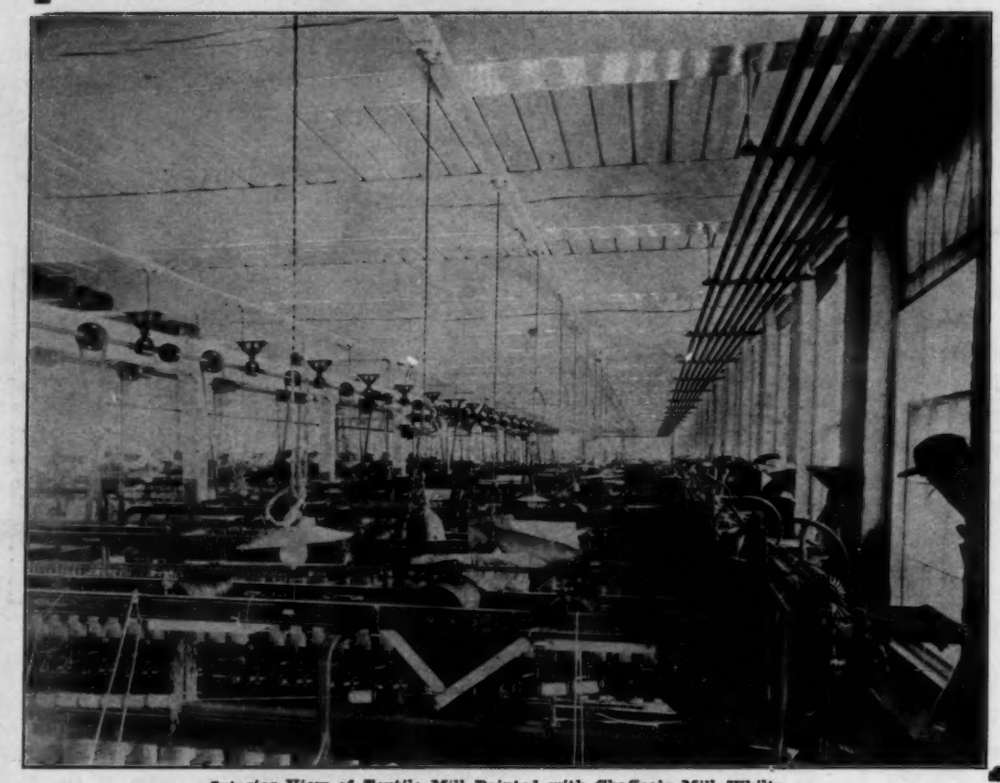

Interior View of Textile Mill Painted with Chaffee's Mill White

Chaffee's Sparkling Mill White

Added Light
Lowest Ultimate Cost
Permanent Finish

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Providence, Rhode Island

viously prepared in a separate tank above the kiers, is run in. While this water is running into the kier A, the valve (b') and the let-off (b) on the kier B are opened and the steam blown through that kier, as was done with A. The valve (b) is then closed and the valve (b') is so turned as to admit the liquor from the bottom of the kier A to the top of the kier B. When the liquor is all blown over from A into B, which is indicated by gauge glasses fixed in the connecting pipes, the steam valve (a') on the kier A and the liquor valve (b') on the kier B are closed and reversed, and the steam is now blown through the valve (b') into the kier B and the liquor is all blown back again into the kier A.

It usually takes about twenty minutes to blow the liquor from one kier to the other with a 45-pound pressure of steam, and this treatment should continue for 8 hours. At the end of 8 hours shut off all steam valves and open the valves (a) and (b) at once, and as soon as the pressure permits take of the manhole lids and cool off the top of the goods in the kier by means of a stream of cold water through a hose. In no case must cold water be directed to any part of the kier before the manhole lids are taken off.

One of the advantages of this style of kier is that it is blown alternately full and empty of liquor; this alternately compresses and loosens up the goods, and in this way ensures a thorough circulation and permeation of the liquor. To prevent lime stains, these kiers must be kept well whitewashed on the inside, and it must be remembered that lime stains may be caused by bad boiling, unlevel plaiting down, deficient circulation, too strong a liquor, incomplete souring, or excess of oxygen. Stains may also occur in the caustic soda boil for the same reasons.

Lime burn is produced by mechanical enlargement of particles of unslacked lime and magnesia, due to insufficient slacking of the lime or straining of the lime water. Iron stains will also occur from rust from the inside of the kier and water pipes unless the kiers are kept well whitewashed inside .

The danger of forming oxycellulose is greater with lime than with caustic soda, hence the absolute necessity of driving all the air out of the kier before boiling and of rapidly cooling off the top and exposed parts of the goods after the boiling is complete.

To sum up: Lime boiling, when conducted under pressure, is far more efficient than caustic soda as usually used. Lime is cheaper, and while it gives good bleaching it requires more careful work, as there is a greater tendency to lime and kier stains, and also to tender goods; but a bleacher who understands his business can easily overcome these disadvantages and produce better results at a lower cost with lime than be can with soda.

Fuller E. Callaway, of LaGrange, Ga., director of sales and finances of the Unity Cotton Mills, The Elm City Cotton Mills, The Unity Spinning Mills, The Hillside Cotton Mills, The Manchester Cotton Mills and the Milstead Manufacturing Company, has issued a large panel calendar showing views of these mills and with a large center panel illustrating the picking and ginning of cotton in Georgia. These mills were built largely to supply cotton fabrics and yarn for the rubber trade, and J. H. Lane & Co., of New York, represent them as selling agents.

American Made Dyestuffs.

The accompanying illustration shows the new factory of Dicks, David & Broadfoot, Incorporated, manufacturers of dyestuffs and chemical supplies, with main offices located at 302 Broadway, New York.

Many cotton manufacturers are under the impression that there are five times as many dyestuff manufacturers in America as really exist. This has not only rendered it difficult for the actual manufacturer when entering the field, to convince the mills of the sincerity of their claims, but has been most confusing and costly to the mills. The necessity for testing practically every shipment of dyestuffs, because nearly every shipment contains a different color strength from that previously used, has proven an expensive proposition to the mills operating in this manner.

In dealing with Dicks, David & Broadfoot, Inc., the mill comes in actual touch with the color manufacturer. In building a business they have gone slowly and have been satisfied to develop one color satisfactorily before taking up a new one. In other words, they believe that the future of the dyestuff business in America depends upon producing quality as well as quantity, and that it is necessary, under present conditions, not only to supply the trade with the colors they desire, but with quality colors that will stand the test.

Officers of this organization advise that they welcome an opportunity to demonstrate their colors to the mills and to give any information they may require about processes.

All their shipments are made from the same shipping point in powder form and of uniform strength. The great advantage in this method of production is that it is practically impossible for different plants to produce a material identically the same. Therefore, if a shipment of color comes from one plant on one occasion and from another plant on another occasion, there is bound to be a difference in quality or in method of handling.

Southern cotton manufacturers will be particularly interested in the progress of this organization because two of the chief officials are well known in Southern mill circles. Robert P. Dicks, the secretary and treasurer, comes from Randleman, Randolph County, N. C., and has been with the Hunter Manufacturing and Commission Company from the time he left school until July 1, 1916. He has been in charge of their colored goods department for the last five years.

William G. Broadfoot, the vice president of the organization, came originally from Fayetteville, N. C. He resigned the superintendency of the Brown Manufacturing Co., and the position of secretary of the Norcott Cotton Mills at Concord, N. C., to go with this present organization in the manufacture of dyestuffs.

Albert David, the president, is one of those unusual men in the chemical industry who possess both chemical knowledge and practical mechanical sense, a combination that has insured the success of many enormous concerns. He was head chemist for a large consulting house for several years and later became consulting chemist for a number of clients. It was while in this capacity that his aptitude in developing the practical uses of applied chemistry became so apparent. His connection with Dicks, David and Broadfoot, Inc., completes an organization for the manufacture of dyestuffs which contains all the essential elements for success.

DICKS, DAVID & BROADFOOT, INC.

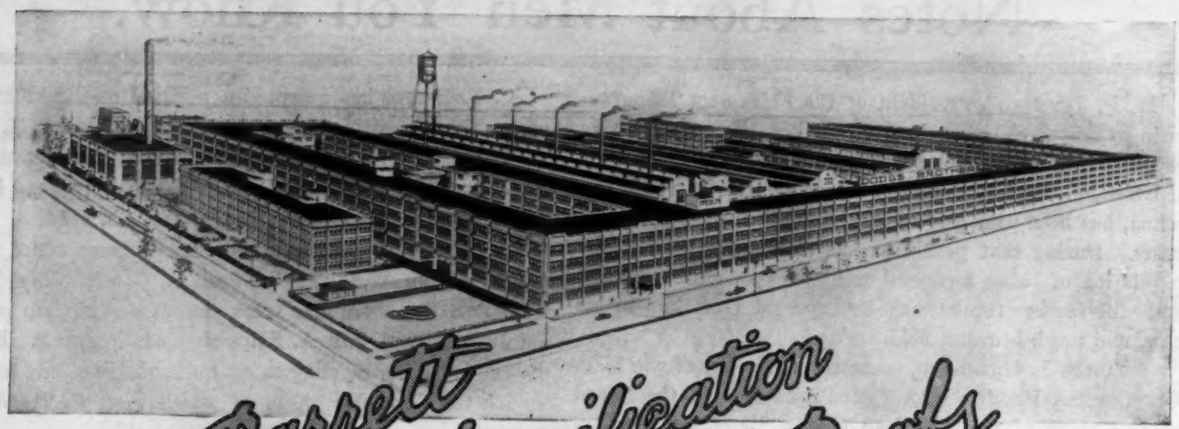
Announces Change in Name.

The Refinite Company, Inc., of Des Moines, Iowa, has been formed to replace the corporation name of the Des Moines Refining Company, under which this organization formerly did business. The parties interested, were led to make this change in the name of the corporation from the fact that the old name, the Des Moines Refining Company, was misleading. "Refinite" is the copyrighted trade mark of this company, and is the nucleus around which the corporation has placed its publicity, and is really the company itself. Therefore, the change to the Refinite Company was the logical thing to do.

President F. W. Woods of this company, is a man who has had a remarkably successful career as a financier and banker. He is now President of the First National Bank of Spencer, Nebraska, and is operating a chain of banks and investment corporations in that state. He is closely associated with other members of the firm and is its principal stockholder.

J. A. Donohoe, who has recently been added to the membership of the Board of Directors, is perhaps the most famous and successful mining attorney in the country, and is the man who perfected the title to the land of the Refinite Company. O. L. Bowersox, George H. Widner and E. E. Moore, other members of the Board of Directors, are the active members in charge of the business at the home office at Des Moines, Iowa.

The Delahunty Dyeing Machine Company, of Pittston, Pa., are sending a 1917 calendar to their customers and friends, which carries a reproduction from the original painting by Harold Matthews Brett, entitled, "My Little Girl." This painting is reproduced by the colortype process and is suitably mounted on contrasting mats, the whole creation being a work of art.



Barrett Specification Roofs

FACTORY OF DODGE BROTHERS Detroit, Mich.
Architects: Smith, Hinchman & Grylls, Detroit, Mich. General Contractors: W. E. Wood Co. and Bryant Detwiler Co., Detroit Roofing Contractors: The G. V. Candler Co., Vaughn Roofing Co., Detroit, and Standard Roofing Co., Chicago, Ill.

WE can't name names but there are two other types of roofs that are offered for the large flat-topped permanent buildings where Barrett Specification Roofs are so generally used.

On the theory of securing more competition and a lower price, some architects make a custom of drawing specifications so broadly that any one of these three types of roofs is eligible, with the result that the flimsiest one, weighing 75 lbs. per 100 square feet, is occasionally selected by reason of its lower price, instead of a Barrett Specification Roof, which contains 235 lbs. of waterproofing material when used over boards and 305 lbs. over concrete and is correspondingly more durable.

In the case of one type a higher fire insurance rate is sometimes an additional penalty.

Now, there is plenty of competition available if a Barrett Specification Roof is exclusively specified.

Roofers obtain their pitch and felt from us at equal prices and compete on the important items of labor, gravel, slag or tile, etc., involved in laying them.

If you want a cheaper, lighter and less permanent roof, specify that kind; but if you want a permanent, heavy, twenty-year-minimum roof that will take the base rate of fire insurance, that is approved by the Underwriters' Laboratories and carries a 20-Year Surety Bond, specify a Barrett Specification Roof—*and see that you get it.*

Every architect knows that if he allows "white pine or hemlock," it will be hemlock.

If he is equally charitable to several grades of roofing, it will be the poorest and cheapest.

Specify specifically!

20-Year Guaranty Bond

We are now prepared to give a twenty-year Surety Bond Guaranty on every Barrett Specification Roof of fifty squares and over in all towns in the United States and Canada of 25,000 population and more, *and in smaller places where our Inspection Service is available.*

This Surety Bond will be issued by the United States Fidelity and Guaranty Company of Baltimore and will be furnished by us *without charge*
Our only requirements are that the roofing contractor shall be approved by us, and that The Barrett Specification, dated May 1, 1916, shall be strictly followed.

A copy of The Barrett 20-Year Specification, with roofing diagrams, sent free on request.

The Barrett Company

Largest Manufacturers in the World of Roofing and Roofing Materials

New York Chicago Philadelphia Boston St. Louis Cleveland Cincinnati Pittsburgh
Detroit Birmingham Kansas City Minneapolis Nashville Salt Lake City Seattle Peoria
THE PATERSON MANUFACTURING COMPANY, Limited: Montreal Toronto Winnipeg
Vancouver St. John, N. B. Halifax, N. S. Sydney, N. S.

TRADE B MARK

Applying Barrett Specification Roof on Oakwood Street Railway Company Car Barn, Dayton, Ohio.
Architects: Pretzinger & Musselman, Dayton, Ohio. Roofers: Rieck Sheet Metal Co., Dayton, Ohio.

Notes About Men You Know.

H. B. JENNINGS, President of the Fairmount Manufacturing Company, Fairmount, S. C., has been elected vice president and general manager of the Union Buffalo Mills at Union, S. C. Mr. Jennings, who is a native of South Carolina, has been president of the Fairmount Mills for seven years. During that period he has earned for himself the reputation of being a careful and successful mill manager, and still further results may be expected from him in his new, and much broader, field.

CHARLES L. GILLILAND, treasurer of the Aberfoyle Mfg. Co., Chester, Pa., has been elected a member of the Board of Governors of the American Cotton Manufacturers Association.

GEO. S. ESCOTT, president and editor of Mill News, Charlotte, N. C., was attacked recently with an acute condition of a long standing trouble, and was taken to the Charlotte Sanatorium for an immediate operation for strangulated hernia. The operation was successful and Mr. Escott is steadily recovering.

GRAHAM KILVERT, assistant superintendent of the Valley Falls branch of the River Spinning Co., Valley Falls, R. I., has been appointed superintendent of the plant, to succeed Henry Pickney.

JAMES VINCENT has been promoted from second hand to overseer of weaving at the Richard Borden No. 2 Mill, Fall River, Mass., succeeding John Collins, who is now at Blackstone, Mass.

EMORY D. KAY, for the past few years overseer of spinning at the Arkwright Mill, Fall River, Mass., recently resigned to go to the Jenckes Spinning Co., Pawtucket, R. I.

E. N. KELLER, assistant superintendent of the Hannah-Pickett Mills at Rockingham, N. C., received a serious injury recently when the automobile owned by him overturned. Five other men from the same mill who occupied the car with him, were also more or less injured, although not so seriously as Mr. Keller. The injured were carried to the Hamlet (N. C.) hospital.

AUG. W. SMITH, president of the Brandon and Poinsett Mills at Greenville, S. C., and the Woodruff Mills at Woodruff, S. C., has removed from Spartanburg to Greenville, where the headquarters of these mills will be in the future.

PAUL WILLIAMS has resigned his position with the Durham Hosiery Mills at High Point, N. C., to become superintendent of the new Slane Hosiery Mills at that place.

E. E. HENDRIX, of Concord, N. C., has been appointed secretary and treasurer of the Canebrake Cotton Mills of Uniontown, Ala.

T. F. DOOLEY, formerly superintendent of the Richmond Spinning Company, Rossville, Ga., has organized the Johnson City Mills at Johnson City, Tenn. The mill will have 50 knitting machines and will be in operation in March.

C. M. BRYD, for several years overseer of carding at the Winona (Miss.) Cotton Mills, more recently night superintendent with the White Mfg. Co., Kimesville, N. C., has accepted similar position with the Aponaug Mfg. Co., Kosciusko, Miss.

C. E. SWEET has accepted a position as superintendent of the Utica Knitting Co. Mill No. 5, Sherburne, N. Y.

WILLIAM WINSOR SMALLEY, president and treasurer of the Bound Brook Oil-Less Bearing Company, Bound Brook, N. J., died on Wednesday, December 27th, 1916.

A. M. BURT, formerly with the southern office of the Berlin Aniline Works at Charlotte, N. C., with whom he was employed for about five years, accepted a similar position on January 1st, with A. Klipstein and Company. He will be employed as traveling salesman in the southern territory under the Charlotte office, of which Paul F. Haddock is manager.

JAMES J. MANNING, who has been in charge of the No. 9 carding department for the Amoskeag Mfg. Co., Manchester, N. H., has been made overseer of carding in the bag department of the same company.

ALONZO ILER, of Greenville, S. C., who recently suffered a slight stroke of paralysis is now at Hot Springs, Ark., for treatment. He was somewhat improved before he left Greenville and his early recovery is expected.

H. C. DWELLE, who recently resigned as secretary of the Erlanger Mills, Lexington, N. C., will open an office in Gastonia, N. C., as a mill accountant.

A. K. SMITH, formerly of the American Engine & Electric Company, and for the past three years with the Bound Brook Oil-Less Bearing Company at Bound Brook, N. J., has been appointed production manager of the latter company in recognition of his faithful and valuable services.

FRED H. WHITE, the well known Southern representative of the Stafford Co., and other machinery companies, is confined to his home in Charlotte with a strained back. In lifting a heavy suitcase Mr. White in some way strained some of the muscles in his back and under the doctor's orders he will have to remain in bed for some time.

PATRICK MCDERMOTT, formerly second hand in the carding department, has been promoted to the position as overseer of carding for the No. 9 mill of the Amoskeag Mfg. Co., Manchester, N. H.

L. L. CHANDLER has resigned as overseer of carding and spinning and twisting at Mill No. 1 of the Apalache Mills, Arlington, S. C., to become superintendent of the Katrine Mfg. Co., Fork Shoals, S. C.

E. P. DAVIS, formerly cashier of the Bank of Harnett, Duke, N. C., has been elected manager of the Erwin Cotton Mills, No. 2, Duke, N. C.

JOHN ROBERTS, formerly superintendent of the Hamburg Mill, Columbus, Ga., has accepted a similar position at the Cooke Duck Mills, Cedartown, Ga.

LEWIS W. THOMPSON, who has for several years been connected with the Southern office of Sykes Bros., Card Clothing Co., at Charlotte, N. C., resigned from this company, effective January 1st, 1917, and accepted a position as Southern agent for the New York and New Jersey Lubricant Company, 165 Broadway, New York City. Mr. Thomason has represented this company for sometime in a part time capacity, introducing their non-fluid oil among the

Is Your Watchman Ready?

It doesn't take a strong man or a brave man to stop fire. But it does take a READY man.

The watchman who carries Pyrene at his side is ready for any incipient blaze.

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Pyrene will damage nothing but fire. Always ready. Needs no recharging until used.

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Pyrene
KILLS FIRE
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Southern mills. His promotion is but the reward for steady and progressive work.

W. A. HOPE has resigned as overseer carding at Steele's Mill, Rockingham, N. C., and has accepted position as superintendent of Entwistle Mills at the same place.

C. M. RAFTER, of Concord, N. C., has become assistant superintendent of the Rockfish Mills, Hope Mills, N. C.

B. R. HICKS has resigned as assistant superintendent of the Henrietta (N. C.) Mills to become superintendent of the power plant at Haynes Shoals, N. C.

JOHN L. ROBINSON has resigned as overseer of carding at the Fulton Bag & Cotton Mills, Atlanta, Ga., to accept a position with the Bibb Mfg. Co., Porterdale, Ga.

I. W. WEEKS has accepted the position of night overseer of spooling, twisting, winding and reeling at the Unity Spinning Mills, LaGrange, Ga.

M. J. HAWKINS, night superintendent of the Corriher Mills at Landis, N. C., was the recipient of a handsome pin and Masonic emblem charm as a Christmas remembrance.

T. H. RENNIE, president of the Pell City Cotton Mills, Pell City, Ala., was a welcome visitor to Atlanta during the early part of January.

SALES MANAGER WOODRUFF, of C. E. Riley & Co., Boston, has been making a Southern business trip. He was a visitor in Atlanta in January.

JULIUS H. STRAIN, general manager of the Echota Mill, Calhoun, Ga., has been confined to his bed for the past 10 weeks with inflamatory rheumatism. His condition does not show much improvement.

JAMES OATES has resigned as night overseer of spooling, twisting, winding and reeling at the Unity Spinning Mills, LaGrange, Ga.

T. A. SHIPP, of Tifton, Ga., has accepted a position as superintendent of the Hart Cotton Mills and the Fountain Cotton Mills, Tarboro, N. C.

A. R. MEEKS has been promoted from overseer of weaving to superintendent of the Putnam Mills & Power Co., Eatonton, Ga.

A. H. HAMILTON, of Wilson, N. C., has accepted position as overseer of No. 1 spinning at the Lumberton Cotton Mills, Lumberton, N. C.

J. H. SEPARK, treasurer of the Gray Manufacturing Co., Gastonia, N. C., has been elected president of the Gastonia Chamber of Commerce, for the year 1917.

M. L. WHITTEN, overseer of No. 2 weaving at the Thomaston Cotton Mills, Thomaston, Ga., on January 8th assumed charge of the weaving in the No. 1 mill in addition to the former position, and also took over the department of slashing, warping, twisting and tying-in.

B. HUNT has accepted position as overseer of carding at the Walhalla (S. C.) Cotton Mills.

J. W. WATTS has resigned as president of the Stony Point Mfg. Co., Stony Point, N. C.

R. D. GRIER has been promoted from assistant superintendent of the Cannon Mill, Kannapolis, N. C., to purchasing agent for the Cannon Mfg. Co., and will be located in Kannapolis.

GEORGE E. WRIGHT, designer for the Nashawena Mills, New Bedford, Mass., has resigned his position to become overseer of the cloth room for the Gosnold Mills, New Bedford, Mass.

S. C. SIMMONS, formerly superintendent of the Paulding County Mfg. Co., Dallas, Ga., has become assistant superintendent of the Cannon Mills, Kannapolis, N. C.

B. A. FOSTER will be superintendent of the new Wearwell Bedspread Mills at Leaksville, N. C.

D. W. MCLEMORE has accepted the position of superintendent of the Roberta Mfg. Co., Concord, N. C.

W. H. LONG has been promoted to assistant superintendent and overseer of carding at the Simpsonville (S. C.) Cotton Mills.

CAMERON MACRAE, Southern manager for the Arabol Mfg. Co., New York, with headquarters at Charlotte, N. C., has joined the ranks of the prospective benedicts, his engagement to Miss Ellen Phifer Gibson of Concord, N. C., having recently been announced.

FREDERICK JACKSON, Southern agent for the Universal Winding Co., was a recent Atlanta visitor.

F. E. BLAIR, formerly of Chickamauga, Ga., is now overseer of spinning at the Manchester Mills, Macon, Ga.

W. T. ROYSTER is now night overseer of carding and spinning at the new plant of the German American Mills, Draper, N. C.

E. A. SCOTT has resigned his position at the Avondale Mills, Birmingham, Ala., to become overseer of slashing and warping at the Asheraft Mills, Florence, Ala.

M. A. CROLLEY has resigned his position at the Darlington (S. C.) Mills to become overseer of carding at Fitzgerald, Ga.

T. N. HONEYCUTT has resigned as second hand in No. 1 spinning at the Dan River Mills, Schoolfield, Va., to become night overseer of spinning at the Efird Mills, Albermarle, N. C.

H. C. GATLIN has resigned as overseer of spinning at the Kincaid Mill No. 2, Griffin, Ga., and accepted the position of overseer of carding and spinning at the Georgia Mill No. 1, of the same place.

PETER OLIVER, formerly overseer of the duck and bag weaving department of the Boott Mills, Lowell, Mass., but more recently with the Tremont & Suffolk Mills, has been appointed night overseer of weaving for the Jenckes Spinning Co., Pawtuckett, R. I.

P. S. MCCUNE has resigned as overseer of weaving at the Harmony Grove Mills, Commerce, Ga., and accepted a position at the Hillside Mills, LaGrange, Ga.

L. H. Thomas, formerly overseer of spinning at Brogon Mills, Anderson, S. C., but for the past year overseer of cloth room in same mill, now has charge of both spinning and cloth room.

J. H. CATO has resigned as overseer of spinning at the Fitzgerald (Ga.) Cotton Mills and accepted a similar position at Tarboro, N. C.

J. H. HULL has resigned as general second hand in weaving at the Lancaster (S. C.) Mills, to become overseer of weaving at the new plant of the Republic Mills No. 2, Great Falls, S. C.

R. J. WRIGHT has resigned as night overseer of carding at the Unity Spinning Mills, LaGrange, Ga., and returned to his former position as overseer of carding at the Manchester Mills, Macon, Ga.

C. L. WINDHAM, formerly of the Columbia (S. C.) Duck Mills, has accepted the position of overseer of carding and spinning at the Fort Mill Mfg. Co., No. 1, Fort Mill, S. C.

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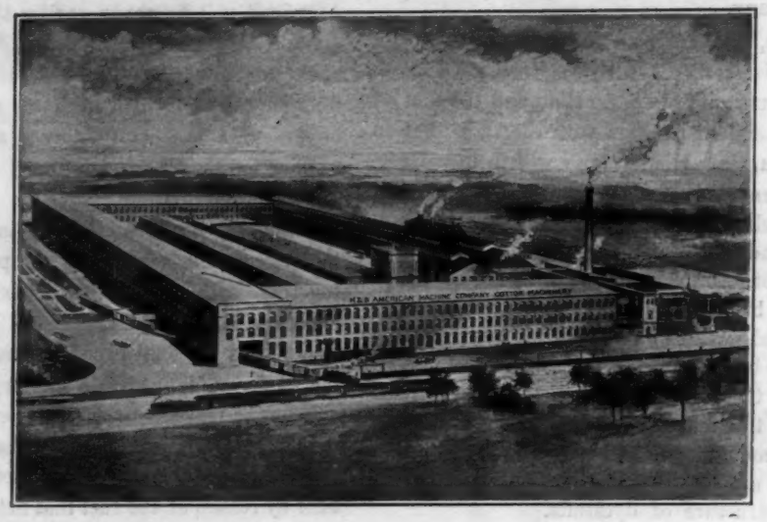
COTTON MACHINERY

Opening and Picking Machinery

Card Room Machinery



Spinning Room Machinery

Twisters for Wet or Dry Work

With Band or Tape Drive

H. & B. AMERICAN MACHINE COMPANY

PAWTUCKET, R. I.

WE SAVE

THE LIVES

OF

CAMS AND ROCKER SHAFTS

WE MAKE THE OLD ONES AS GOOD AS NEW

In ordering new Looms specify that they be equipped with our devices.

CLINTON CAM COMPANY, CLINTON, S. C.

J. C. TIDDY has accepted the position of overseer of spinning at the Patterson Mill, Roanoke Rapids, N. C.

B. C. Roberts has resigned as carder at the Asheraft Mills, Florence, Ala., to accept a similar position at the Lauderdale Mills, Meridian, Miss.

D. S. MATTOX has resigned as overseer of carding at Walhalla, S. C., to accept a similar position at the Greer (S. C.) Mfg. Company.

GUY L. MELCHOR, who for nearly nine years has been traveling representative for Joseph Sykes Bros., card clothing manufacturers, has resigned his position and the first of February accepted a similar position with the D. D. Felton Brush Co., of Atlanta, Ga. His territory will include Georgia, Alabama, Tennessee, Louisiana, Mississippi, Florida, and Texas. Mr. Melchor is very popular with the mill men of the South, and enjoys a reputation for ability that he should be proud of. A man of sterling qualities, clean-cut, and attentive to business, he stands high in the estimation of his friends, who wish him well in his new position.

PAUL NOBBE, who has been connected with the New York Sales Department of the Bayer Company, Inc., for thirteen years, has assumed the duties of sales manager for the American Aniline Products, Inc., 120 Hudson Street, New York City. This is a new enterprise, devoted principally to the domestic manufacture of dyestuffs.

H. H. FLEMING has accepted the position of overseer of weaving at the Harmony Grove Mills, Commerce, Ga.

ARTHUR KITCHENS of the Imperial Mills, Eatonton, Ga., has accepted a position as overseer of weaving at the Jefferson (Ga.) Cotton Mills.

MACK BLAKELY has been promoted to overseer of weaving at the Simpsonville (S. C.) Cotton Mills.

M. T. POOVEY has resigned as overseer of spinning at Lenoir Mill, Lenoir, N. C., to become superintendent of the Tuckaseege Mfg. Co., at Mt. Holly, N. C.

BOOK REVIEWS

All Books Reviewed Under This Heading May Be Procured From COTTON at the Published Price.

FACTORY ACCOUNTING. By Frank E. Webner, C. P. A., 345 pages, 84 illustrations. Bound in half leather. Price $3.30. Published by La Salle Extension University, Chicago.

The science of factory accounting is still in its infancy, but it is growing with remarkable rapidity—so much so that a book on the subject may be modern and adequate when published and quite obsolete five years later. Recent improvements have greatly cheapened the process of accounting and supplied many mechanical aids which reduce the labor of collecting costs. Some of these are still unknown to the majority of accountants, and a more general dissemination of these newest ideas would do much to increase the efficiency of our factories. This is the aim of this book, which is a practical guide and not merely a reference work for experts. The style is easy and animated and the explanations lucid and simple. The chapter heads show the wide scope of the work. They are: Organization (Synthesis and Analysis, The Human Element, Responsibility, Charts); Controlling Accounts; General Exhibit; Current Exhibit; Cash Account; Purchases; Specific Orders; Process Production; Convergent Methods; Material; Labor; Expense.

Answering the fifth annual call. "Motor Trucks of America" will be ready earlier this year than ever before and the distribution will begin January 15th. When this book was first published in 1913 by The B. F. Goodrich Company it met with such an enthusiastic demand from buyers, owners, manufacturers and truck agents that its publication has been continued each year with an ever-increasing circulation.

Probably the greatest value in this book lies in the fact that it contains actual photographs of each make of truck together with the detailed specifications of the various models. This data is furnished by the manufacturer who also checks the final proofs to guard against any errors being made. This insures a source of information as dependable as the manufacturer's catalog. It must not be inferred that "Motor Trucks of America" displaces the manufacturer's own literature but it does occupy an even broader field by reason of the fact that between its covers it gives the reader an opportunity to study each make of truck separately or in comparison with other makes.

The countless new fields for the motor truck which have been opened by the unprecedented business prosperity of 1916, together with the necessity for more speedy deliveries, has likewise stimulated the use of commercial cars in all lines of business. Their idea in asking that requests for this book be written on a business letterhead and addressed to the Akron offices is not because they want to limit the distribution to any particular class of people or buyers but rather to know just where each copy goes. The increased cost of publication this year makes each copy cost slightly more than twenty-five cents and it is quite necessary to somewhat guard the methods of distribution. "The introductory article in this 1917 volume will be especially interesting to those who now own motor trucks for it deals at length with that ever important problem of lengthening the life of the motor truck."

Self Aligning Ball Bearing Hangers and Pillow Blocks, is the title of a booklet just issued by the S. K. F. Ball Bearing Co., Hartford, Conn. It contains 48 pages of carefully prepared illustrated and descriptive matter designed to illustrate the saving in power and lubrication to be obtained by the use of the material described. A copy of this booklet may be secured on application.

The Western Electric Company, 463 West Street, New York City, have just issued their electrical supply year book for 1917. This book follows the plan of uniform list prices and discounts inaugurated in their year book of 1915. The book contains 1312 pages and hundreds of illustrations. For the purchasing agent or mill man who desires information concerning all kinds of electrical devices and equipment, this book will prove very useful as a handy guide and reference.

How Other Men Manage

Practical Discussions by Cotton's Readers on all varieties of Mill Subjects

What Will Increase the Breaking Strength.

EDITOR COTTON:

I have read the November and December numbers of your magazine very carefully and I find them full of good information. In the November number I saw a note telling about COTTON being used as a text book in two well known colleges. I know personally of a textile school that has, in one department, been using the articles and discussions found in your magazine for the past five years, and I know that much information has been received and retained by both instructor and students.

I find from personal study that many knotty problems are explained and many men are helped without the informant being in any way injured. You know there are many men who are afraid to give information, fearing, probably, that some one will take away their position. The more I read and study, the more I find that the man who knows and gives information is the one, who, not only can retain his *present* position, but is the one who is sought to fill *higher and more important positions.*

The article on slashers, by A. W. Thompson, in the November number shows that too much thought and study cannot be given to this important part of the preparation of yarn for weaving.

The article of G. D. Crain Jr., about using colors for different yarns was good. It has to my knowledge been in use for a great many years and has proven such a success that every man studying this line of work should read and study this article thoroughly.

I missed the questions by "O. K. Miss.", but in reading the answers it shows that these problems are thoroughly explained by men who know their subject.

The article by "Toothless Tom", in November, should put many men wise, who have otherwise been either careless or have never noticed. The trick of the sand roll and marking close to the edge of the cut were most practiced. I cannot understand how the weavers can get by with so many tricks unless the loom-fixers are working with them. I believe every gear pertaining to any machine, when not in use, should be locked in cupboards and only repair men allowed to have access to them.

The article by "Wash" is good and I agree with him about the card-grinder. If, after giving good service and getting good work from the cards, this grinder was discharged only for the fault given, a mistake was made. I do not agree with his claim that only sight is essential in grinding. It has been found that a great many grinders are deaf when being spoken to, but they have been so accustomed to setting their grinding wheels that their sense of hearing is acute while at their especial work. It is now so hard to find good, honest card grinders that the man having one working for him should lock all the mill doors, figuratively speaking, and hold him to himself, for it means that so far he is shouldering only part of the burden of a carder. Think of the work and worry upon a carder who cannot get an efficient card-grinder. I say this man has made a grave mistake and will rue it.

The article in the December number, by T. M. McIntyre on spinning, is one of the best that has been given and it goes so well into details that it should be of great help to many men.

In the article on weaving, by A. D. Martin, he has suggested something that I thoroughly believe in and I am sure will in time come about. He says that the overseer of weaving should have charge of the spooling, warping and slashing, and he should. I have seen places where the weaver would have to complain continually about some slight defect in the yarn caused in this department and after two or more complaints it would receive attention, only to come back to its old state. The weaver knows, or should know what is the best amount of size, etc., for good weaving, and had he charge of this department he could arrange things so that the best results might be had in the weave room, giving more satisfaction to the weavers and also no detriment to the other employees, at the same time, in many cases, increasing production and reducing costs.

In the article by C. H. Strickland, he has given the essentials for a good overseer, and the sooner the men preparing for overseers' berths come to realize that he is right, the sooner they will advance and the more successful they will become. There are no persons who will not work better and feel better at all times when they respect the man in charge, and they cannot respect him unless he has made a thorough study of himself, and his methods, and has placed himself in the positions of other people. It is not very easy or satisfactory to work for a man who is always finding fault. The man who is most successful is the one who can criticise and then show the remedy.

Replying to the question asked by "F. T. (S. C.)," I should say the distance from the licker to the feed plate will be determined by the length of cotton, the distance being at least ¼ inch greater than the staple. This, of course, is determined largely by the shape of the nose plate; it should give the teeth of the licker plenty of space to thoroughly loosen the fibres before they pass from the bite of the feed roll and the dirt and foreign matter are then more easily extracted.

The article on keeping numbers reminds me of a place where, today, the fixers are neglecting their regular work to change frames. Just as stated, there is always trouble about numbers and yet no one seems to know why. Yet if anything is said to those in charge, they say, "mind your own business. I am running this place, not you." It is a

poor system, and it never has given good results and it never will.

I would like to have the following answered:

Which is the correct standard to use on 1⅛ inch American cotton for breaking strength?

What will increase this breaking strength?

What can be done in the card room to aid toward this result?

What is the best standard to use in placing twist on spinning frames?

What standard is used to find the breaking strength of two-ply yarns? Carder, (Mass.)

Why is the Square Root Used.

EDITOR COTTON:

I wish to ask the contributors to your discussion page a very simple question, for which I find many people have no adequate answer. The question is, "Why do we take the square root of the hank roving or yarn number in making twist calculations?" H. K. (N. C.)

Winding Room Waste.

EDITOR COTTON:

The question of waste is one that is always with us. When it comes to the amount of waste necessary, this is a variable factor and one which requires a great deal of careful consideration. We are getting so much good material through your department entitled "How Other Men Manage," that I am going to ask the readers to aid me in a little problem of my own.

Let us assume that a mill is equipped with H. & B. spinning frames containing say 3,792 spindles; and that this mill also has eight pairs of mules (Asa Leas will do) with a capacity of 10,048 spindles; or a total of 13,840 producing spindles working on an average of 15's carded yarn and producing say 40,000 lbs. per week. Suppose all of this yarn is wound on winders, and presuming that this mill is equipped with eight Broadbent winders and four Foster winders, how much waste should be made in the winding room per week? Have the amount of waste as shown, also include any which might be termed unnecessary waste that would be more than likely to reach the winding room.

A winding room man.

Figuring Operation Costs.

EDITOR COTTON:

I am very much interested in the cost accounting and expense analysis of textile mill operations, particularly those other than the weaving costs, such as winding, warping, dyeing, etc.

I believe that if some of your readers would explain these matters fully from their standpoint, showing how they figure these costs and how they figure loss for waste and also for imperfectly made products (which is another form of waste) it would prove very interesting reading for many of us. H. S. C. (Conn.)

Which Way Should the Lap Run?

EDITOR COTTON:

In answer to "Wash (N. H.)," on "Which Way Should the Lap Run," I would say that an examination of soft steel drawing rolls on a mule running 34 years fails to show a sharp edged flute which would damage the edge of the lap. Rather they were rounded to such an extent it was necessary to re-flute them to get satisfactory work. He does not consider the action of the stock against the lap when the roller is drawing it. What about that? I question whether or not there is any lagging on the part of a loose boss top roll on a fly frame or mule, regardless of the fact that it is friction driven. The fact that this method of running rolls is universally adopted as correct should answer for itself. Also this should apply to bobbin lead fly frames.

Spinner.

Note.—Once again we wish to call attention to the fact that communications which are not accompanied by the name and address of the writer, usually find a resting place in the waste basket. While we do not publish these names, we do need them as an evidence of good faith; also, these contributions are paid for and it is impossible to compensate an unknown person. The foregoing letter is a sample of many we receive and if "Spinner" will communicate with the editorial department of COTTON we shall be glad to have further communications from him.—The Editor.

Some Interesting Tests.

EDITOR COTTON:

The following tests were made at the Textile Department of A. & M. College, West Raleigh, N. C., and may be of interest to your readers.

Test No. 1. This test is probably the more interesting one. All the waste roving was collected and run through extractor. This was done to break up the roving and have it in suitable form for feeding to the breaker picker. One good lap was fed with three waste laps on the apron of the finisher picker.

The comparison of the variation in the finished yarn is especially interesting, the variation being only 7 per cent, which is considered good for a yarn spun from single roving. The test could have been more elaborate in detail but the time was limited.

The test was run to show the quality of yarn made from roving waste and spun from single roving in creel of the spinning frame. A waste lap containing 100 per cent waste was attempted but excessive splitting of the lap suggested the use of 25 per cent good cotton. To prevent the splitting of laps on the card, three strands of roving were run into the laps at the lap roll. The maximum pressure on the calender rolls and lap racks was used in order to obtain a firm lap. No trouble was experienced in running the stock through the card at a doffer speed of 11 r. p. m. with 27¾ inch doffer.

Weight of drawing sliver	60 grains.
Slubber roving	.70 hank.
Fine roving	1.99 hank.
Yarn Number Average	18.7

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ADMIRALITY is a semi-bituminous low volatile product of SMOKELESS combustion which compares most favorably with the best grades of Welsh coal.

Analysis made by the United States Government of twenty-five consignments of ADMIRALTY for barges and steamers at Hampton Roads, approximating 43,000 tons, resulted as follows:

Moisture	2.6	Vol. Matter	18.9	Fixed Carbon	76.5
Ash	4.5	Sulphur	.88	B. T. U.	14,921

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COMPARISON OF ACTUAL AND MECHANICAL DRAFTS.

Slubber, mechanical draft	5.83
Slubber, actual draft	5.09
Fine roving mechanical draft	5.47
Fine roving actual draft	5.68
Spinning, mechanical draft	10.01
Spinning actual draft	9.4

$$\frac{\text{Surface speed of front roll}}{\text{Surface speed of back roll}} = \text{Mechanical draft}$$

$$\frac{\text{Weight per yard fed}}{\text{Weight per yard delivered}} = \text{Actual draft}$$

Comparison of yarn spun, 3 bobbins taken.

twist per inch = 30

Break. In Lbs.	Weight Grains	Break. In Lbs.	Weight Grains	Break In Lbs.	Weight Grains
70	57	69	52.5	65	53.3
65	56	69	54.5	62	53.3
66	56	69	54	62	52.6
62	55.5	65	52.9	62	53.5
70	57	68	52.5	63	52.5
65	55.6	69	51	64	51.5
Total ...	337.		314.		316.
Average	56.		52.4		52.7
Variation	2.7%		3.6%		3.8%

Per cent variation between bobbins 7 per cent.

Owing to the large amount of twist this yarn contained a comparison of breaking strength was not found necessary. The reason for this amount of twist was that the yarn had to be made into two ply and had to have a hard twist.

YARN BREAKING STRENGTH.

Test 2. The breaking strength of yarns is a regular method of comparing one yarn with another. Here we have taken the same size yarn and applied different amounts of twist in order to find at what point the maximum strength was reached. The results are satisfactory and valuable for reference.

This test was run to find the twist per inch to give the maximum breaking strength to 16's yarn. The tests were made from a group of four bobbins spun at same time. The same group of spindles being used for each run.

STRENGTH TESTS FOR 16'S YARN.

Twist gear.	35	33	30	29	27	25	23
Figured twist per inch	14.3	15	16.6	17.2	18.5	20	22
	120	115	123	120	119	112	109
	109	125	114	112	116	113	99
	113	120	115	110	115	105	99
	119	113	121	120	120	105	100
	108	114	110	110	110	107	90
	116	130	109	115	107	116	110
	117	122	123	116	109	107	99
	119	126	108	113	112	100	100
	110	128	125	114	114	108	100
	115	120	120	120	115	106	99
Total	1146	1213	1168	1150	1137	1079	1005
Average	114.	121.	116.	115.	113.	107.	100.

From this test we learned that a twist gear of 33 teeth gave us a maximum breaking strength. (See second column of table.)

$$\frac{\text{Twist per inch}}{\sqrt{\text{Yarn No.}}} = \text{Twist multiplier}$$

$\frac{15}{\sqrt{16}} = 3.75$ Twist multiplier used to obtain the maximum strength.

SLIVER UNIFORMITY.

Test 3. It is generally known that an increased number of doublings will increase the uniformity of the sliver. The result of this test proves that theory.

The test for uniformity of sliver was made with 4, 5 and 6 doublings. Twenty 3 yard lengths were taken and the results recorded as follows:

Test	4 doublings Wt. per 3 yards	5 doublings Wt. per 3 yards	6 doublings Wt. per 3 yards
1	137 grains	160.5 grains	211.5 grains
2	139 "	162 "	206.5 "
3	132 "	161 "	212 "
4	136 "	165 "	215 "
5	134 "	157.5 "	213 "
6	137 "	159 "	214 "
7	135 "	160 "	212.5 "
8	136 "	156 "	206.5 "
9	138 "	161.5 "	209 "
10	126 "	158 "	212.5 "
11	140 "	166 "	214.5 "
12	130 "	168 "	211.5 "
13	128 "	165 "	212 "
14	130 "	161.5 "	210 "
15	138 "	161 "	215.5 "
16	138 "	163 "	216 "
17	132 "	167 "	212 "
18	130 "	164.5 "	214 "
19	139 "	159 "	210 "
20	142 "	155 "	217 "
Total	2697 "	3230.5 "	4245 "
Average	134.8 "	161.5 "	212.7 "

Per cent variation 11.9 per cent, 7.4 per cent, 5 per cent.

This test proves the value of doublings in obtaining uniformity of weight per yard. Card sliver was fed to this drawing frame and a draft of 6 was given in each case.

H. K. (North Carolina.)

The New York and New Jersey Lubricant Co., of 165 Broadway, New York, have established a service department composed of men who are thoroughly familiar with textile mill machinery and who have been especially trained in the lubrication of this class of machinery, with the greatest economy and efficiency. These men are practically lubrication experts and are placed at the disposal of all mills interested in the elimination of friction through suitable lubrication. The work of these experts is confined to instructing overseers as to the proper grade of lubricant to use for various purposes and how to apply these lubricants to avoid waste and secure the best results.

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What is more important than providing efficient power transmission equipment in your new plant or additions you are about to build? Can you think of a single item which can cause bigger losses and harder ones to fight? You specify your power generating installations first and then build with them in mind. Apply the same policy to *power delivery* at machines.

New power plant additions, considered necessary because of supposed power shortage, have actually been proven useless because S K F Ball Bearing Hangers reduce friction load from 55 to 72%.

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SKF BALL BEARINGS

Palm Beach Goods.

EDITOR COTTON:

Will you have some of your readers furnish in detail the construction of "Palm Beach" goods and tell why they are so named? Also explain from what material they are made. What book or books do they know of which contain a full description and the construction of many different weaves? L. C. H. (Georgia).

EDITOR COTTON:

Replying to your correspondent, would say that "Palm Beach" fabrics are so named because of their adaptability for wear during the summer months. They are usually made in light colors, solid and also often with narrow silk stripes.

The best grades of these goods are made from two-ply yarn with mohair filling, but the cheaper grades are made of all cotton.

The construction of these goods varies according to the price at which the finished product has to be sold, the best suitings being made with mohair filling.

A cotton Palm Beach fabric recently analyzed was made with the following construction: 54 inch cloth, 58 inches in reed, 2680 ends, 2/22's warp, 32's filling, 50 ends per inch, 82 picks per inch, 23 reed 2 in a dent. It is not necessary to weave the cloth the width given, any width suitable for the cutter-up could be made. There is a very small contraction in the warp because of using two-ply yarn and a much finer filling than the warp. This causes all the contraction to be on the filling.

A construction of mohair Palm Beach fabric is as follows: 54 inch cloth, 60 inches in reed, 2-ply 20's warp, 15's mohair filling. Woven with a number 35 reed, 1 in a dent 2112 ends in warp. This cloth will be made 40 picks per inch in the loom, and the contraction in the loom will only be about one-half inch in width, the finished cloth being about 54 inches and having about 39 x 39 ends and picks per inch.

In regard to a good book on fabrics and weaves, I would recommend the Cotton Fabric Glossary, published by the American Wool & Cotton Reporter, Boston, Mass.

Reader, (N. C.)

Some Electrical Questions.

EDITOR COTTON:

I have been reading your paper with interest, and appreciate the splendid technical subjects covered. I would like to ask a question through your discussion page.

Will some reader, who is a practical electrician, give me the rule for figuring the horsepower in an electrically driven plant? Also explain how electric meters are read and the price per kilowatt hour figured, etc. For example, suppose I were using 150 kilowatts, what horsepower would this be, and what would be the cost per month providing the current cost was 2 cents per kilowatt hour?

I am an overseer, and have been in a steam driven plant up until a few months ago. If some one who is acquainted with electrical power will furnish suitable replies to these questions through COTTON, I shall appreciate it very much.

An Overseer (N. C.)

Making Warp Yarn From 1 Inch Cotton.

EDITOR COTTON:

Referring to the discussion of making 29's warp yarn from 1 inch American cotton, let us first take a little review of the discussion by looking up just what "Wash" said in his first article on the subject.

In his first article "Wash" says that the limit has been reached when 28's warp yarn has been made from 1 inch American cotton. He also says that the warp yarn has been made lighter in order to save a few cents in the mule room, or because there is a shortage of filling ring spindles. In my opinion no practical mill man would ever think of changing his mill over for such reasons as those given.

The writer asked in the October issue of COTTON how "Wash" knew that the limit had been reached when 28's warp yarn had been made from 1 inch American cotton? "Wash" replies in January COTTON, and says that after doffing, if the travelers are so heavy that they break many ends, and changing a number lighter will cause the yarn to whip, then the limit is reached, for the reason that the only remedy left is to insert more twist to carry the proper traveler.

"Wash" should have also added that, if the man in charge did not know what to do in order to keep the yarn from whipping when the lighter traveler was put on, then the limit has been reached, until someone comes along who knows what to do.

Did I not say that "Wash" should have changed his rings if necessary? I will also say that if his frames are set with the spindles the proper distance from the front roll and he cannot successfully make 29's warp yarn, there is no use of examining the frame longer to find the trouble, it will be necessary to examine the man.

Will "Wash" kindly tell us how he knows when the limit has been reached for spinning one inch American cotton on mules where there are no travelers and no "whipping" of the yarn?

"Wash" says, "we all may boast but none of us can have spinning to run good with poor stock." I am not boasting, but I will say that if I could not successfully spin 29's warp yarn from 1 inch American cotton that I would not tell anyone, and I surely would not try to tell anyone else what to do. "Honest Bill" does not advocate running poor stock only when it is spun properly and is accepted by the trade that it is intended for. It is two different things altogether for one man to spin yarn and another to try and spin it, and no one need to worry about "Honest Bill" being kept down to the bottom of the ladder by advocating the use of poor stock. In fact the chances are that "Honest Bill" will get to the top first, and will have to throw a line to his critics to help them up.

If "Wash" ever gets down in this part of the country I would be delighted to show him a spinning room running day in and day out making 30's splicing (3.50 mult.) from 1 inch American cotton, if he has never been able to see the trick turned it might be worth his time and expense to take a look at it. He will be welcome.

Honest Bill, (Ky.)

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Ring is simple—Has only one moving part.
The rest is merely a case for the traveler.

The Union Spinning Ring

RING SPINNING is hampered by a ring which always was a mechanical blunder. Nothing can make its unoiled traveler really efficient; and to make it run at all, the roving, the temperature, the humidity, vibration of the spindles, levelness of the frames, centeringof the rings and the speed of drums, front rolls and spindles must all be "conditioned" to nurse this faulty thing along. When at a great expense this has been done it makes defective yarn, breaks down ends, wears out fast, and limits speed. However, it has been the only way so long that mill men hardly realize the losses it imposes on them.

THE UNION AIR-CUSHIONED ring and SELF-LUBRICATED, circular traveler is a correct mechanical design for more perfect spinning. It requires no nursing; but fits itself to the conditions it finds, and spins superior yarn, without breaking threads, at any speed possible to the spindles,—one, two, three or four thousand turns faster if desired. At the present speeds it makes yarn from 5% to 7% stronger, breaks no ends except from defects in roving or rolls, winds a better bobbin and does not wear out for more than a year. Its eye prong is a spring and provides a very soft "drag" on the yarn. The traveler cannot "dog" and the pull being uniform, almost eliminates thin places in the product.

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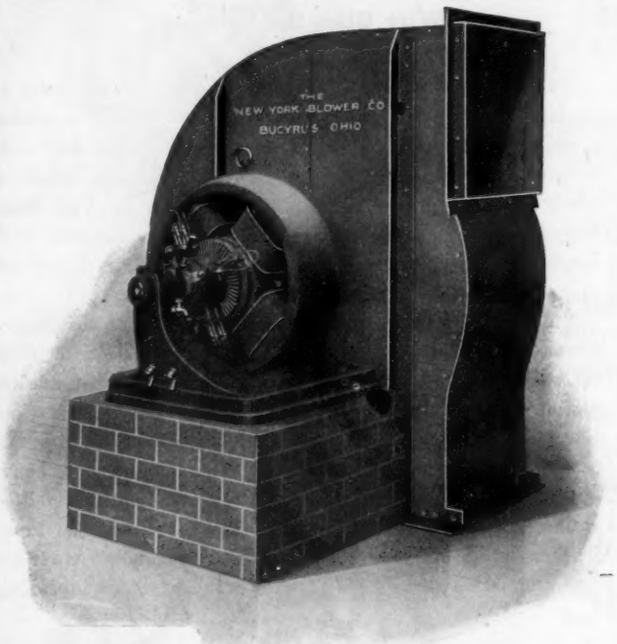

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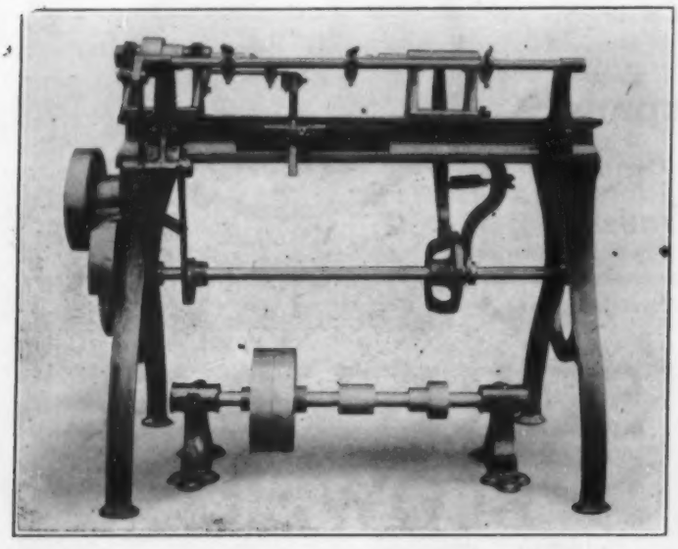
Saving Money for the Mills.

Identifying yarns by colors is a plan that has worked successfully in a number of mills and will work successfully in many others. It involves the use of spools with the ends painted in different colors or in different designs of the same color according to the type of machine and the other surrounding conditions.

An occasional coat of paint or shellac on bobbins and spools is an investment that pays good returns to any mill. The upkeep of these small, but important parts, often indicates the difference between efficient and inefficient management.

It has frequently been the custom to let the mill painters paint these bobbins and spools at odd moments, but where there is a careful division of the expense account, it makes this cost detail entirely too large. The machine shown in the illustration was devised to eliminate this difficulty. It is known as the J. E. Lock spool and bobbin painting machine, and is sold by the Blandin Company of Lawrence, Mass.



With this machine the proper care is given to the spools and bobbins with the greatest ease and in any colors adapted suitable to the work in hand. It is not necessary to ship the equipment from the mills elsewhere for the finishing, and it may be operated by any unskilled person; either a boy or a girl can handle it satisfactorily. In this manner the life of these very necessary parts of the equipment is greatly prolonged and they are kept in the best possible condition for use.

It is stated that 75 per cent of the new bobbins manufactured in the United States are painted on these machines. Any ordinary class of bobbins may be handled at a speed of twenty-five to thirty a minute, and all painted alike in a first-class manner and without waste of paint. This machine may also be used to paint the disk on warper spools, and any spools with heads up to five inches in diameter may be shellacked or painted either on the inside or the outside, or both at the same time at the rate of 16 per minute.

The cost of operation for painting six-inch spools is a big saving over ordinary repair prices and they may be handled at a total cost of approximately $1.25 a thousand. Bobbins may be handled at much less, and it is estimated that twenty-five cents a thousand is an average price. Many mills are buying bobbins and spools unpainted, and thus saving 75 per cent of the extra cost of painting by doing this work at the mill. Further information on this useful machine may be obtained from the Blandin Company, Lawrence, Mass.

Setting Feed Plate to Licker-in.

EDITOR COTTON:

I saw in the last issue of COTTON, under the head of "How Other Men Manage", two questions for discussion, of which I will attempt to discuss the first one only. This question is divided into two sections. First. What is the best distance to set the feed plate from the licker-in on a card? This distance should be between the bite of the feed-roll and the lower edge of the face of the feed-plate and should be from 1/16 to 1/8 inch longer than the average length of the cotton being worked. Second. Why should it be set this way? By regulating this distance in accordance with the length of staple being worked, the entire length of the staple is so supported that it receives the full benefit of the cleaning and disentangling action of the licker-in, which reduces the work on the finer parts of the card. As it is necessary that the fibres should be free from the bite of the feed-roll before the action of the teeth of the licker-in exerts its greatest pull, which is at the lower edge of the plate. Otherwise, the fibres would be broken.

C. A. D. (N. C.)

Wire Glass the Solution.

Proper construction of window screens in elevators is an important factor in preventing fires. When a screen is nailed on the outside of a window frame, chaff and dust accumulate behind the screen. Fires originate when a spark alights in this chaff and rubbish. R. M. Van Ness, contractor of Omaha, Nebr., would do away entirely with window screens and use heavy wire glass. His ideas are expressed as follows:

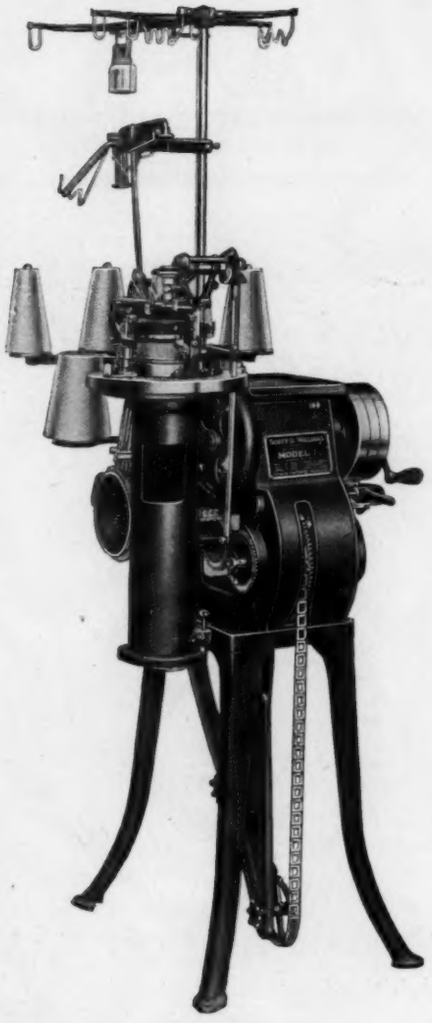
"I do not favor window screens, for the reason that a screen of a mesh fine enough to keep out sparks soon clogs up with dust and becomes a nuisance. The larger meshed screens will keep out stones and hail but will not keep out the sparks. The best solution that I know of is to spend a few more dollars on each window and put in a heavy wire glass. The chances are better than ever that neither stones nor hail will break such glass, and if they do break it, there is no hole left through which sparks can enter the building. Heavy wire glass is the solution, in my opinion."

On November 20th, 1916, the Draper Corporation succeeded the Draper Company; since that date all business has been in the name of the new Corporation. Its home address and office is Hopedale, Mass., and the Southern office is 188 South Forsyth Street, Atlanta, Ga. The Draper Corporation also assumed the publication of *Cotton Chats* beginning with the December, 1916, issue.

KNITTING SECTION

The Attention of all Manufacturers of

WOMEN'S HOSE



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Fashioned Welt Machine MODEL K

This Machine produces women's hose with an inturned knitted welt similar to that produced on full fashioned machines. The machine has all the features of our other Models—each stocking being dropped from the machine complete, except for the looping of the toe. It is fitted with five yarn changing fingers, inserts an "anti-run-back" course, and the welt being knitted on the machine, has all the elasticity of the fabric and may be made as wide as desired.

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Send for this free book, "Light Without Power." It will tell you all about Pastello and show how more daylight means more profit to you, how it reduces lighting bills, increases health of employees, etc. **Ask for it today on a post card.**

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Southern Knitters Meet at Asheville

Between 75 and 100 Southern knitters and representatives of kindred interests congregated at the Langren Hotel in Asheville on Wednesday, January 23d, for the annual sectional meeting held under the auspices of the National Association of Hosiery and Underwear Manufacturers.

President Withers, of the National Association was unable to be present and J. A. Groves, secretary of the Wiscassett Mills at Albermarle, N. C., was elected chairman. However, owing to his temporary absence from the hall, Secretary C. B. Carter, of the National Association, opened the meeting and R. L. P. Reifsneider, editor of the Knit Goods Bulletin, acting as temporary chairman, conducted the meeting. He did this so successfully that Mr. Groves refused to replace him on his arrival.

It was a very good natured bunch of men who gathered in the meeting hall on the sixth floor of the hotel at 2:15 p. m. The "get together" luncheon had been a success and with cigars drawing well each man present was willing to listen to suggestions made by other men. It did not take long to inject spirit into the meeting and discussions pro and con kept the chairman busy recognizing the various members.

This keen interest was started by Mr. Reifsneider, who referred to the Cooper letter and the proposed form of a binding contract between the knit goods manufacturer and the buyer.

A. Victor Victorious, of A. V. Victorious & Co., New York, thought that the association, or a committee for the purpose, should get up some form of binding contract, and if this was suitably done he believed that most mills would adopt it. Mr. Victorious' company represents a number of hosiery mills as selling agents.

Guy Northcutt, of the Marietta (Ga.) Knitting Company, did not believe that those mills selling the retail trade would be interested, or that they could or would use binding contracts. It is much easier and cheaper, he pointed out, for these mills to cancel say a 60 dozen order than it is to try and enforce the contract.

A. L. Patterson of the Lillian Knitting Mills at Albermarble, N. C., declared that he thought the binding contract a good idea provided it did not present too formidable an order form, so as to scare a prospective buyer and thus prevent him from signing any contract.

C. F. James, manager of the Carolina Hosiery Mills at Marion, N. C., and others expressed themselves on this important subject and then a resolution was recommended for the association to print and forward to customers, reading as follows:

"Resolved, That we recommend the adoption and enforcement of a form of contract binding both parties mutually, and further recommend that from this date binding contracts only be negotiated and concluded in which there shall be no provisions or conditions guaranteeing prices against market decline, or inconsistent with the spirit and purpose of the contract as recommended.

The next subject taken up for discussion was the open price exchange between the different members of the association divided by groups according to goods manufactured.

It was shown that such a proposition had been worked out among some of the underwear manufacturers and the results were so satisfactory that the membership of this group was steadily increasing. This open price arrangement has been in existance for several months and is working out satisfactorily to all members. It is believed that such an arrangement would have a tendency, just at this time, to induce the smaller manufacturer to get as much for his goods as any other manufacturer. Such a move would undoubtedly tend toward a standard or more stable price.

Letters were read from a number of members and one hosiery manufacturer was quoted as saying, "There is no line of work in which it will give me more pleasure to co-operate." Another said, "We are heartily in favor of the move and will lend our support to the fullest extent possible." Still another stated, "We are willing to go into the open price exchange with others in our line."

It is believed by some hosiery men that there is nothing that will so greatly benefit the entire membership of the association as a daily record of sales and prices of its membership. Such a frank interchange of views would tend to knit the membership closer together. It is also believed that the present is a particularly opportune time to start such a movement because there are so many new mills starting to manufacture hosiery, that are unacquainted with prices, do not know how to figure waste and other items, and through a lack of experience are apt to under-estimate actual costs of manufacturing.

John M. Jones of the Sweetwater (Tenn.) Hosiery Mills also gave his ideas on this subject and while he had the floor expressed the regrets of John M. Berry, the well known Rome, Georgia, hosiery manufacturer, at his inability to be present. Mr. Berry had just called on the long distance telephone to furnish a list of orders and prices relating to his lines for the benefit of the open price discussion he knew was in progress at the meeting.

A resolution was adopted to give the open price system a trial along some lines.

The cash discount proposition was next taken up and a number of members stated that all sales by their mills was on a basis of 30 days net.

R. L. P. Reisfsneider described the collection system of the association for the benefit of any non-member knitters who might be present. He also told of other co-operative service being rendered.

The Federal child labor law came up for discussion and President Erhard Mayer of the National Hosiery Mill, New Orleans, outlined the arrangements made in his state. "Under the new law," he said, "the child must go to the factory inspector for a certificate before he or she may work. Therefore, when a child produced a satisfactory certificate the manufacturer was entitled to employ such child with the full knowledge that he could not be held responsible for any irregularity in the certificate itself."

A protest was sent by telegraph to the Ways and Means Committee of the national house against the incorporating of an excess profits tax in the proposed revenue

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More than 29,000 in Successful Operation

These new machines have made possible the success of new lines of extra fine gauge hose and half hose.

Many leading mills of the country are now largely equipped with these new machines, and their absolutely successful operation has been demonstrated.

Standard Gauge
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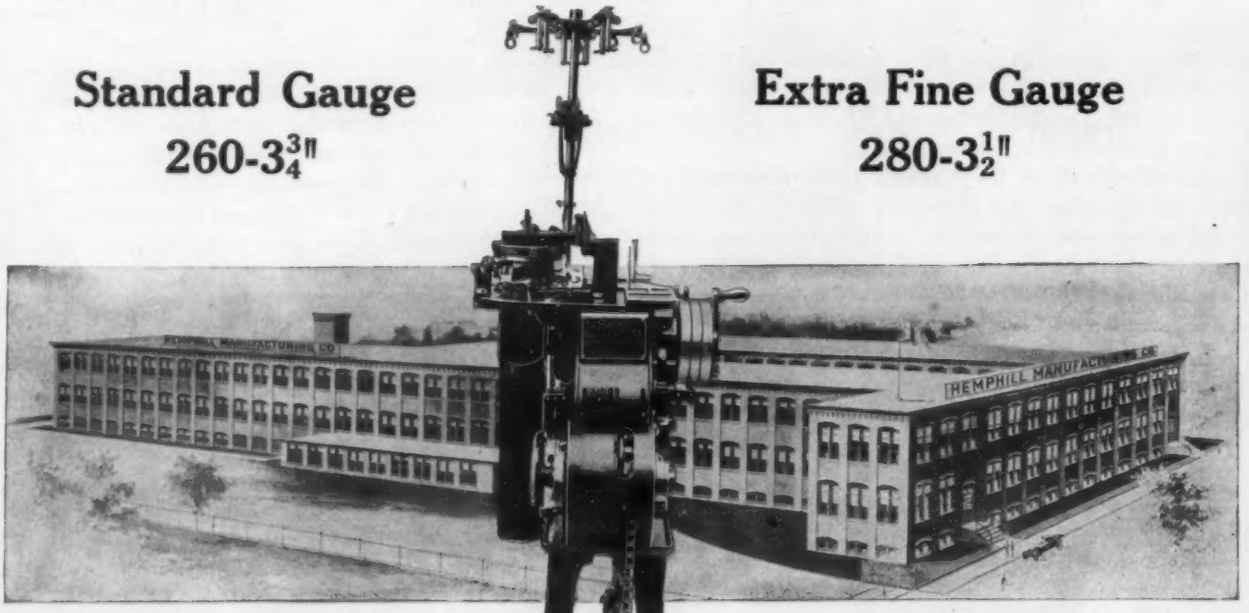

All parts easily accessible from front of machine.

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Hemphill Mfg. Co.,

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NEW YORK OFFICE 350 BROADWAY

bill. The exact wording of the protest was as follows:

"At a meeting of Southern Knit Goods Manufacturers, held under the auspices of the National Association of Hosiery and Underwear Manufacturers, at Asheville, N. C., on this date, a vigorous protest was unanimously adopted against the proposed excess profit tax of the proposed revenue measure now under consideration."

The meeting then adjourned.

The number of Tennessee manufacturers present was comparatively small, largely because the legislature of that state was in session and discussing one of the freak laws so common with state bodies, this time a "minimum wage bill for women and children." This is, of course, merely another labor union measure aimed to increase the number of male workers at the expense of needy widows and children.

Among those present at the meeting were the following: Walter F. Fancourt, Jr., of Harding & Fancourt, Philadelphia; Guy Haynes Northcutt, of the Marietta (Ga.) Knitting Co.; A. Victor Victorious, of A. V. Victorious & Co., New York; Allen Deas, of the Trus-Con. Laboratories, Detroit; T. J. Golden, of the Aberfoyle Company, Chester, Pa.; S. T. Gaddy, of the Fidelity Hosiery Mill, Newton, N. C.; Carl B. Cline, of the Waldensian Hosiery Mills, Hildebran, N. C.; J. A. Cline, the Kilson Hosiery Mill, Connally Springs, N. C.; E. Lyerly, treasurer of the Elliott Knitting Mills, Hickory, N. C.; W. F. Hetrick, president of the Hetrick Mfg. Co., Gainesville, Ga.; G. A. Flournoy, of the Southern Textile Machinery Co., Paducah, Ky.; James P. Grey, of the Grey Hosiery Mills, Hendersonville, N. C.; H. A. James, of H. A. James & Co., New York; Eugene B. Carter, Holston Mfg. Co., Lenoir City, Tenn.; R. Preston Freeze, Hendersonville, N. C.; G. W. Pritchett, of the Morse Chain Co., with headquarters at Greensboro, N. C.; B. V. May, Daisy Hosiery Mill, Burlington, N. C.; C. J. Seeley, of the Hemphill Mfg. Co., with offices at Charlotte, N. C.; H. W. Kirby, Spartanburg, S. C.; A. L. Patterson, of the Lillian Knitting Mills, Albemarle, N. C.; R. T. Edwards, of the Johnson City (Tenn.) Mills; E. L. Shuford, of the Wanford Knitting Mills, Hickory, N. C.; Thomas S. Bernie, of Colter & Bernie, New York; J. M. Reynolds from the Philadelphia office of Harding Tilton & Co.; J. H. Shuford, from the Charlotte office of the Berlin Aniline Works; A. H. Thatcher, treasurer of the Standard Processing Co., Chattanooga, Tenn.; T. F. Dooley, treasurer of the new Johnson City (Tenn.) Mills; C. B. Carter secretary of the National Association with headquarters in Philadelphia; R. H. Johnson of Charlotte, N. C.; Erhard Mayer, president of the National Hosiery Mills, New Orleans; G. Schroder, from the Charlotte office of the Cassella Color Co.; T. A. Cavanaugh, from the Philadelphia office of the Cannon Mills; R. E. Clapp, treasurer of the Bradford Knitting Mill, Statesville, N. C.; J. W. Keons, of the Royal Hosiery Mills, High Point, N. C.; Roland Swallow, of C. M. Plowman & Co., Philadelphia; A. M. Burt, from the Charlotte office of A. Klipstein & Co.; H. B. Neebe, of Lawrence Neebe, Inc., New York; L. L. Arnold, editor of COTTON, Atlanta, Ga.; James A. Greer, of Greenville, S. C., representing the Textile World journal; A. W. Latta, of the Gastonia (N. C.) Cotton Yarn Co.; R. L. P. Reifsneider, editor of the Knit Goods Bulletin, Philadelphia; J. E. Mills, of the High Point (N. C.) Hosiery Mills; A. F. Garron, of the Vandois Knitting Mills, Morganton, N. C.; J. P. Jeter and Walter Snyder, of the Walter Snyder Co., Philadelphia; R. P. Smith, of Smith Drum & Co., Philadelphia; C. F. James, manager of the Carolina Hosiery Mills, Marion, N. C.; Albert Weisler and R. M. Ogburn, of Edward S. Hyde & Co., Philadelphia; S. L. Diggle, of H. A. James & Co., New York; William G. Broadfoot, of Dicks, David & Broadfoot, Inc., New York; W. H. May, treasurer of the Daisy Hosiery Mill, Burlington, N. C.; Max Einstein, of the New Brunswick (N. J.) Chemical Co.; John Humphrey, of the Dary Ring Traveler Co., Taunton, Mass.; George E. Goodwin, from the Atlanta office of the Pyrene Manufacturing Co.; J. A. Groves, secretary of the Wiscassett Mills, Albemarle, N. C.; W. F. Carr, of the Durham (N. C.) Hosiery Mills, and David Clark, of the Southern Textile Bulletin, Charlotte, N. C.

Meeting of Pennsylvania Underwear Men.

Substantial progress toward a fair and safe contract and the elimination of the cash discount by mills was made at the bi-monthly meeting of Pennsylvania Underwear Manufacturers, at the American House, in Reading, on January 13. The meeting was the most spirited assemblage of underwear manufacturers of the United States that had been brought together for a number of years. While there was a healthy disagreement on several trade subjects, there was but one opinion, seemingly, as to the wisdom of a uniform contract, net billing and a discontinuance of freight prepayment and cartage allowance.

In the absence of Edward Blood, Sr., of John Blood & Co., Inc., Philadelphia, who was convalescing from a stubborn though not serious illness, C. B. Carter, secretary of the National Association of Hosiery and Underwear Manufacturers, under whose auspices these bi-monthly meetings are held, presided. The Franklin Underwear Mills, Reading, enrolled as a member of the association, and announcement was made that earlier in the day the Fisher Hosiery Company, Reading, Pa., and the Signal Knitting Company, Chattanooga, Tenn., had enrolled.

S. D. Bausher, one of the better-known underwear manufacturers of Pennsylvania, was urged by the meeting for a place on the Tariff Commission. His name had been suggested in letters from a number of manufacturers to the association, all dwelling on his capability and the importance of having the knitting industry represented on the Commission.

Keen interest developed in efforts to arrive at a form of contract fair alike to manufacturer and merchant, binding upon both, regardless of market changes, and giving the merchant the advantage in a rising market and protecting the mill in the event of a decline. A manufacturer who is accepting only signed orders constituting a form of contract held to be enforceable in the Courts, reported that at the outset some of his customers were reluctant to accept the terms of the contract, but that now it is accepted and viewed as imposing no hardship upon any buyer whose purchases for the future are made in sincerity.

After hearing of the experiences of several other members in procuring signed orders for all for which they are willing to obligate themselves, the meeting, without a dissenting vote, went on record in favor of the form of con-

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It will not rip nor ravel

The stitches lock

Many millions of garments are now being made with "Flatlock" Seams by over one hundred leading Knit Goods manufacturers in the United States, Canada and Great Britain.

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Forest Mills
Fine Weave
KNIT UNDERWEAR
Follows the Lines and Curves of Your Body as Faithfully as Your Mirror Reflects Them
FOREST MILLS Underwear is so perfectly proportioned and accurately shaped for the slender, the medium, and the stout that every type of figure can be fitted "without a wrinkle."
This finest of underwear, exquisite in weave and texture, is perfectly tailored; yet gives with every movement of the body without a bind or draw, due to its skillful weaving and to the clever placing of the flat-lock seams to allow the right fullness over bust and hips.
The flat-lock seam is an innovation in knit underwear. The fabric is joined together without over-lapping, making the seam as dainty as the rest of the garment, and insuring that beautiful smoothness so necessary to comfort and to the fit of outer-garments.
Forest Mills Underwear may be had in every desirable style and weight, at prices to suit every purse. The band top finish—as used on the finest French undergarments, is a new feature on the low neck and no sleeve models.
Ask at your favorite store for the daintiest, most-delightful-to-wear undergarments they carry—then look for the FOREST MILLS label; better still, ask or write your store for Fabric 3180 if you prefer medium-weight cotton, Fabric 3398 for soft merino, and Fabric 3287 for lustrous silkateen and merino. Fabric 2030 will bring you misses' heavy-weight merino. These are only a few of the most wanted styles in Forest Mills undergarments. You may choose from filmiest gauze to heavy wool, as individual needs and fancy dictate, and in models specially designed for evening, as well as those for general wear.
Brown Durrell Co.
Sole Distributors

Reprint from the "Evening Bulletin," Philadelphia, Oct. 19th, 1916

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tract ismilar to that adopted by the National Association of Sheet and Tin Plate Manufacturers, which contemplates an irrevocable sale and purchase, not subject to cancellation, postponement of delivery or price revision because of market conditions. The sentiment of the meeting was embodied in the following resolution which was unanimously adopted:

Resolved, That we recommend the adoption and enforcement of a form of contract binding both parties mutually, and further recommend that from this date binding contracts only be negotiated and concluded in which there shall be no provisions or conditions guaranteeing prices against market decline, or inconsistent with the spirit and purpose of the contract as recommended.

The suggestion was offered that manufacturers send copies of the resolution to their customers. Announcement was made that printed copies, in quantities desired, would be supplied by the National Association of Hosiery and Underwear Manufacturers to manufacturers of knit goods at a nominal charge to cover cost of printing and postage.

Reports was made of the manner in which the Philadelphia Sweater Manufacturers' Association is protecting members against merchants who cancel orders without just cause. A member receiving a cancellation reports it to the secretary, who promptly transmits the information to all the members. The information is sent also to the National Association of Hosiery and Underwear Manufacturers, with which the sweater organization is closely affiliated, and is to be made available to all members of the association in the several knit goods division who report cancellations. By this means all knit goods manufacturers in the association who desire to co-operate in the cancellation information bureau may be kept advised through bulletins from the association of the names of merchants assuming to unjustly cancel an order.

Intimation was given that it is designed to include in the information bulletin lists of delinquent accounts passed to the association by members against customers who ignore requests for settlement or an explanation, or resort to subterfuge or misstatements for evading their liability to the manufacturer.

For closing the door, so far as possible, against technicalities upon which either party to a contract might seek to cancel, the meeting favored a memorandum to the effect that "orders be not accepted unless accompanied by full details; provided, however, that change in assortment be permitted upon proper notice to the mill thirty days in advance of shipment."

In view of the wanton abuse of the cash discount terms by a number of merchants, the underwear manufacturers went on record in favor of net terms, f. o. b. point of shipment. Seven of the mills represented reported that they sell on net terms only, and that, as their terms are understood generally by the trade, the question of discount never enters into a transaction. When the experiences of these mills were related several other manufacturers stated to the meeting that all new business offered to them would be taken only on a net basis. It was made apparent that concerted action on the part of manufacturers can be made to speedily get rid of the cash discount provision, with very little resistance from distributors.

The action antagonizing cash discount was recommendatory rather than binding, and was embodied in a resolution as follows:

"It is the sense of the meeting that thirty days' net is the proper trade terms upon which to sell, and that those who are now selling on a different basis be urged to co-operate in bringing about the general adoption of thirty days' net terms in the future."

The proposition for an open price exchange, while regarded as working toward an ideal situation, received little encouragement, principally because of the great disparity in manufacturing detail and difficulty of accurate trade descriptions. There is little likelihood, therefore, that open competition will be attempted by Pennsylvania underwear manufacturers. There is a probability, however that one or two groups of manufacturers will give the plan a try-out, with the intention of its adoption permanently if the experiment prove successful.

Instances of startling advances in the prices of some lines of underwear were cited during a presentation of market conditions as viewed by a number of members. A garment formerly $3.20 a dozen now is going to jobbers at $4.95, and a line that sold last year at $3.50 has been moved up to $5.25. In the low-end class, a hitherto dollar-a-dozen ladies' vest is just 50 per cent higher. A popular make of hosiery was referred to as showing that socks have kept pace with underwear in price changes, the half hose of this particular number that last year jobbed at $1.75 to $1.85 having advanced to $2.50.

Manufacturers, several members thought, would be safe in making commitments for cotton to cover for needs until July. While no one would admit that he foresaw a slump in cotton, all agreed that it might be the part of wisdom to buy yarn with caution and try to prevail upon knit goods buyers to restrict orders to their bare necessities.

"Sail close to the wind," was one member's injunction. "Don't plunge; you might profit, but you also can profit by a safety course and letting the other fellow take the speculative end."

A strong appeal for having mills base each week's selling prices on current yarn prices was made by a manufacturer who declared he was not and would not be sold up; that his mill was operating, in a way, on the hand-to-mouth basis. The plan was admitted to be logically correct, but mills heavily supplied with yarns at prices well under those of the present did not care to fall into line just now.

At one stage of the discussions, when it became apparent that the Pennsylvania underwear manufacturers were welding a closer bond of fellowship than ever hitherto prevailed, a member insisted that hereafter meetings be held monthly. At this juncture a letter from a member hosiery manufacturer was read, urging periodical meetings of hosiery manufacturers in the territory in which Reading is the center. The outcome was the adoption of a resolution providing for bi-monthly meetings of each of the hosiery and underwear divisions, members in each to be invited to the meetings of the other. Beginning with February, the hosiery manufacturers, therefore, will conduct the meetings bi-monthly, the underwear manufacturers having the floor at the March meeting and in alternate months thereafter. Under this arrangement representatives of both divisions will be free to participate in the general discussions at the meetings of either, each conducting the meeting alternately

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PRODUCTS

Underwear, Sweaters, Cuffs with Cut Welt, Selvage, or French Welt, Mantles, Collarettes, Toques, Golf Caps, Hosiery Tops, Skirts, Borders, Corset Covers, Button Stays, Mittens, Bandages.

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Rectangular Slots, Hardened at Bottom, Sectional Caps and Cam Rings, Hardened and Ground surfaces, Sensitive Take-Ups, Two Speed Drive, Dogless Attachment, Positive Pattern Mechanism, Needle Guard and Protector, Automatic Stop Motions, Electric Cloth Cutters.

Characteristics

The characteristics of a knitting machine, like those of an individual, are determined by its origin and history; just as knowledge of the individual's family, schooling, and early life are desirable for the formation of an idea of his characteristics, so knowledge of the plant, personnel and ideals involved in the construction of the knitting machine are necessary for an understanding of its merits. Investigate the origin of our knitting machinery.

Wildman Mfg. Co.

ESTABLISHED 1889 **NORRISTOWN, PENN.**

and devoting the time mainly to matters bearing more directly upon its own lines.

With periodical meetings in the South and the Central West, as inaugurated more than a year ago, and the Philadelphia hosiery manufacturers getting together monthly and the Philadelphia sweater manufacturers semi-monthly, it was pointed out, the association will be materially strengthened in its work of correcting trade abuses, weeding out undesirable accounts and conserving the interests of the several divisions of knit goods manufacturers.

The Use of Trade Acceptances.

BY RALPH H. BUTZ.

During the last ten years the merchants and manufacturers of the United States have come to the realization that something is radically wrong with our credit system, and while the subject has been discussed before practically all the leading business organizations, the remedy has been as far out of sight as ever. Suggestions have been made for the curtailment of credits to such an extent as to guarantee approximate safety, but the evil has remained just as it was before. Why? Because we have persisted in doing business by the same antiquated method that our forefathers used. The result was that our business losses were heavy, and many merchants and manufacturers were forced out of business on account of losses that would not have occurred under a more practical credit system.

The present manner of handling credits is very nearly the same that it was in the pioneer days. In those days business was not so well organized and everybody was willing to take a chance. Profits were large, goods were not so readily secured, and losses were looked upon as unavoidable in every business. But the profits were large enough to permit losses. Now we have outgrown the pioneering instincts, and we are no longer willing to make business a gamble. Profits are too small for that. We are seekers after safety, and that is just what we do not have.

Our business men have always been more or less familiar with the methods by which transactions with foreign merchants have been handled. If we buy goods on credit from a European seller he insists that he receive payment for them immediately, through a banker. As soon as the goods are shipped all the documents pertaining thereto are forwarded to the banker in this country. The goods are then delivered to us by the banker after we have signed the acceptance or obligation to pay for them at a certain future date, according to the terms of sale. We in turn have used the same method in dealing with foreign buyers, demanding payment for our merchandise as soon as the documents showing actual shipment are delivered by the banker. We are unwilling to extend loose credit to foreign buyers, for they are situated in such a position that we could not readily reach them by legal means.

In the European nations all sales are made upon the same conditions. No merchant in Germany, France, or other European country expects for a moment that the seller will intrust him with goods upon his mere verbal non-negotiable promise to pay. He knows that he can not obtain possession of the goods until he has given his written acceptance, acknowledging receipt of the goods and his promise to pay for them at a certain date. These acceptances are sold to the banks and are considered among the safest forms of commercial paper in Europe. If the buyer does not pay his trade acceptances on the day they are due he is in the same position as the merchant in this country who allows his checks and notes to go to protest.

Our present system of carrying non-liquid open book accounts is a very serious problem to many manufacturers. Frequently there has been competition in the terms upon which goods are sold, some manufacturers offering to allow thirty days more time for payment than their competitors. The manufacturer is also compelled to bear a burden which should not be his. He must invest a large amount of money in his plant and raw stock before he can turn out the finished product, and in addition he is compelled to finance the purchaser's business for a period that ranges anywhere from thirty days to six months.

In order that trade acceptances may come into more general use in this country the Federal Reserve Banks have been authorized to accept them for discount, without the usual papers that are attached to bills of exchange, and they will be discounted at a lower rate than other forms of commercial paper.

The reason that the United States Government is so anxious that trade acceptances shall come into general use is because our national credit system has been one of the major causes of the financial stringencies that have afflicted this country at frequently recurring intervals. Too much of our wealth has been tied up in non-liquid credits. Now if these credits can be transformed into liquid form, our capital will be instantly available when needed. Financial depression will be practically eliminated when the merchant and manufacturer can realize the actual cash for their sales.

It will also tend to abolish the "cash discount" evil. The cash discount is in reality an enormous price that we are paying in order to retain our capital in liquid form. We are all familiar with the merchant who takes the cash discount at his own convenience, no matter at what time this privilege expires. We are also familiar with the merchant who is continually making claims for allowances, often for no other purpose than to extend the due date of his purchases; and of the one who offers a note in payment when the due date is near, and offers to renew the note in part when it becomes due.

There are a number of manufacturers who are earnestly endeavoring to introduce trade acceptances among their customers. But a few men can not change our prevailing system. All business men should strive together for this cause. It is not for the good of a few. It is for the good of all, and it is necessary to secure the ultimate financial strength of the nation.

It is a well-known fact that when a merchant has unlimited credit he is liable to overstock himself, and not a few failures have resulted from this particular cause. However, if he knows that he will be required to pay for his purchases on the date when due he will be more cautious and exercise his best business judgment. He will think seriously before ordering large quantities which he has no reasonable chance of selling. He will know that he cannot let the accounts drag until it suits his convenience, because

STAFFORD & HOLT

Builders of
CIRCULAR

Rib Knitting Machinery

For Knitting the Latest Style Fabrics FOR

Jackets, Borders, Etc.
Underwear, Sweaters,
Toques, Cardigan

Also Builders of

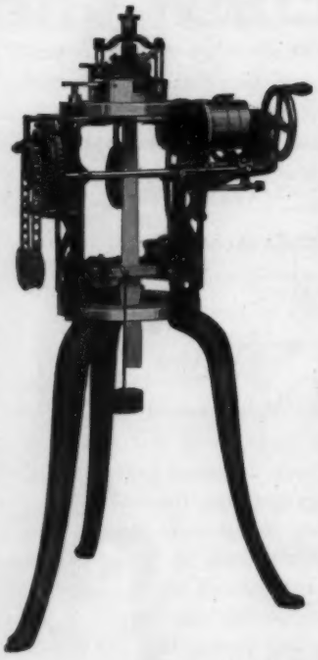
Napping Machines

The Stafford and Holt Pineapple Stitch Machine is the Latest.

Write for Descriptive Circular.

Little Falls, New York

H. BRINTON CO.



Builders of

Circular Knitting Machinery

of every kind for every purpose

Hosiery Ribbers

with the very latest attachments

Full Automatic Hosiery Footers

Body Machines, Sleevers, etc.

for Underwear, Sweaters, Toques, et c.

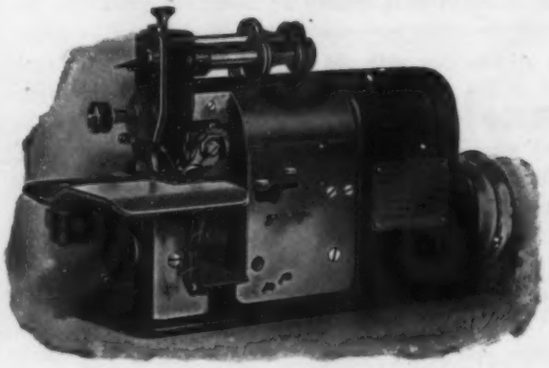
Write for Catalog, Prices and Samples.

213-217 Race Street, PHILADELPHIA, PA.

Canadian Agent: Hartley Kay, Ltd., Georgetown, On

THE MERROW

High Speed Overseaming, Overedging and Shell Stitch Machines



Our Class 60 Machines
For Trimming and Overseaming in one operation produce the strongest seams with the greatest economy.
USE STYLE 60S for welting Stockings, blind stitch.
USE STYLE 60HD for hemming bottoms of Underwear.
USE STYLE 17B or 22 for Bed Blankets.
STYLE 18 is for Horse Blankets.

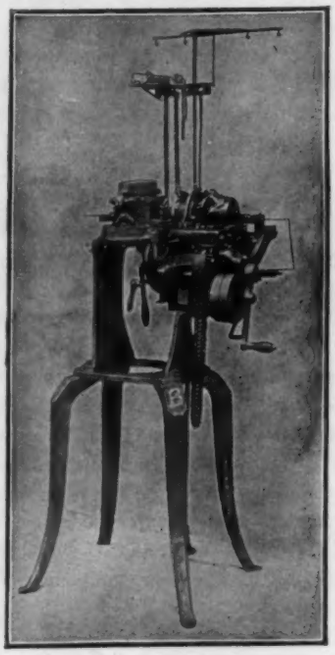
SEND FOR SAMPLES AND CATALOGUE

THE MERROW MACHINE CO.

28 Laurel Street, HARTFORD, CONN.

467 Broadway, New York, 815 W. Van Buren St., Chicago
Knickerbocker Bld'g, 6th and Arch Sts., Philadelphia, Pa.
1019 E. Baltimore St., Baltimore, Md.

BOSS Full Automatic KNITTER



It will make the neatest, most uniform and most perfect work, and is the most profitable of any knitter on the market.

It has the simplest Automatic Splicer in the world and never causes trouble. All parts are interchangeable. Compact and strongly built. Runs easily and breaks very few needles, seldom if ever requiring repairs.

So simple that an unskilled operator can learn to run it in a day.

The Boss Knitter means more production for the money than any other machine. Investigate.

Send for Particulars.

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The terms on the enclosed invoice are sixty days, net, but if you will accept the attached draft in proper form we will be able to offer you ninety days' time.

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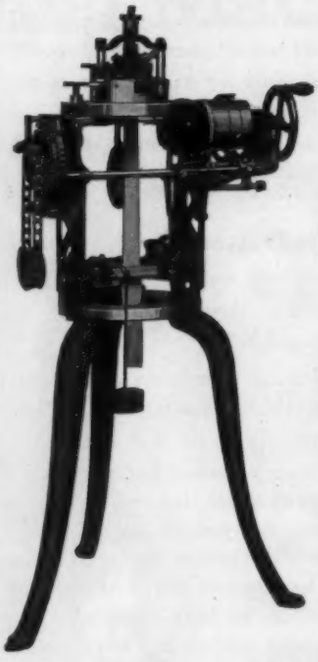

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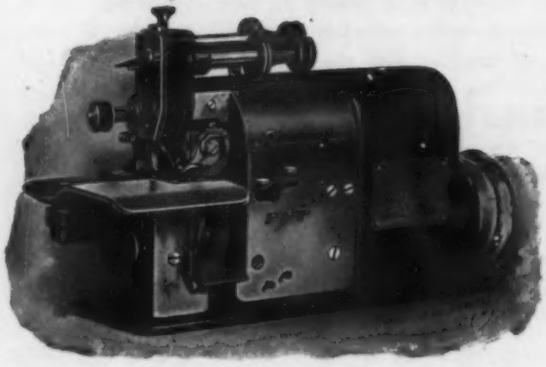

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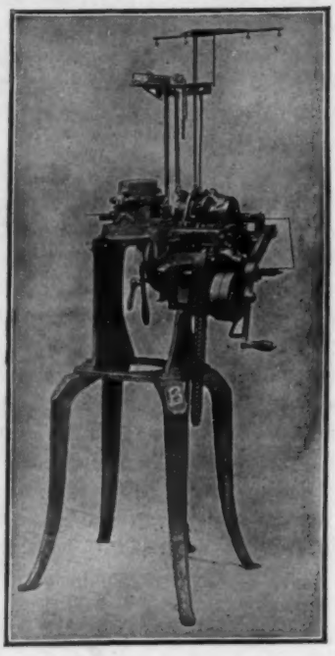

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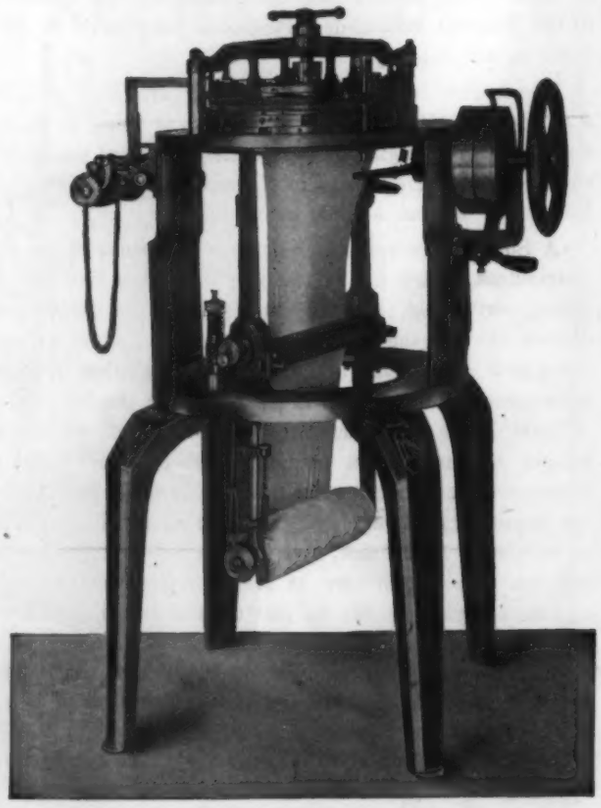

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MANUFACTURERS OF

Circular Rib

Knitting Machinery

FOR

Underwear and Hosiery

OFFICE AND SHOW ROOMS
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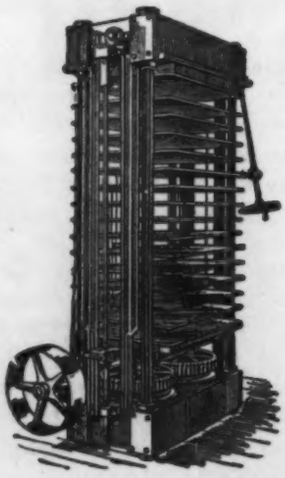
PHILADELPHIA, PA.



RELIANCE

Hot Plate Screw Press

FOR

Hosiery and Underwear

Write for Catalog and Prices

Reliance Machine Works,
FRANKFORD, PHILA.

BOARDS FOR FAST BLACK DYERS.

HOSIERY FINISHING BOARDS.

BEST WORK. PROMPT SERVICE. PRICES ALWAYS RIGHT.

JOS. T. PEARSON 1815-21 BOSTON AVE KENSINGTON PHILA.

Aniline Dyes
Dyewood Extracts
AND ALL
Textile Chemicals

Baltic Chemical Co.

PHONE 4142 WORTH 4143 4144

183 Duane St. New York

Works: YONKERS, N. Y.

to mills covered for yarn requirements. A large Eastern mill that ordinarily goes out in January for Fall business has no thought of preparation for the next season, and is selling from production for immediate wants.

A Pennsylvania mill has served notice on its customers that deliveries will be from 30 to 50 per cent short of the orders on its books. Another, which owes one customer approximately 14,000 dozens of hose and half hose, to be delivered by June 1st, took advantage of an alleged dereliction on the part of the customer, to repudiate the order, and the latter is offering substantial advances over contract prices for a guarantee of delivery.

Instances such as these are common, and carry their own story of hosiery scarcity. Of course much of the demand comes from merchants who have been disappointed by manufacturers who either oversold, were caught short of yarn, or have felt the strangling effect of labor agitators' arrogance. A few price comparisons serve to show the state of the market.

A line of misses 2 ounce ribbed that is being delivered at 77½ cents is selling at $1.02½ spot, the price being based on size 7.

A mill reports that it is getting $1.50 to $1.60 for 220 needle carded yarn ladies' hosiery for which 92½ cents was the prevailing price at the opening for spring of 1917. A ladies' mercerized, 300 needle at $2.50 shows a strong advance, and one mill, giving much attention to finish and extra high spliced heel, is talking $2.65.

Manufacturers of 144 needle half hose have matters pretty nearly their own way in holding their price up to 90 to 97½ cents.

A line of silk half hose that formerly went to the jobber at $3.37½ to $3.50 and retailed at 50 cents has moved up to $4.25 and probably will bring the retailer 65 cents. There are many instances of the retailer getting a larger proportionate advance than either mill or jobber, leaving the consumer to charge the "high cost of living" to primary hands.

One of the large distributors says that December's new prices on underwear for this spring were 18 to 20 per cent over the opening, and that since the then new prices were made figures have been materially moved up. The average increase on low end to medium to the present is said to be 30 to 35 per cent, and there are many persons who are outspoken in asserting that today's prices will prove to have been the lowest of the year, present buyers getting the bargains.

A few jobbers who had bought in excess of probable needs and were fortunate in getting delivery are reported to have made a profitable turn-over in selling to commission merchants and Western houses. While they unloaded part of their holdings at less than current mill prices, they had a comfortable margin of profit, sufficient probably to equalize matters should the market suffer a decline during the season.

These jobbers may find it necessary to replace stock at higher prices, but in that event will suffer little if any handicap in competition with merchants who did not take advantage of the opening prices.

The Pennsylvania Underwear Manufacturers division of the National Association of Hosiery and Underwear Manufacturers at a recent meeting went on record by unanimous vote for a contract binding seller and buyer alike, for making every sale and purchase an irrevocable transaction, with no provision guaranteeing change in price as market conditions fluctuate.

Spinners who have been consulted on the subject agree that there should be no difficulty in getting a contract that cannot be broken, and as many jobbers are urging such a form of contract with retailers and express regret that they did not exact it last year from mills, it would appear that it is up to the manufacturers of knit goods generally to enforce the policy outlined by the Pennsylvania Underwear Manufacturers.

A proper contract would have saved hundreds of thousands of dollars to mills in 1914 and would have been in the buyers' favor in the last few months; and both sides would be better off in having averted considerable friction and maintained more business-like relations.

Failure to embrace the present opportunity would in part justify the complaint from hosierymen that their industry is not well managed.

Deliveries in underwear lines have been more satisfactory than in hosiery. In the latter there has been wanton disregard of specifications by a number of manufacturers. The mill that is filling its contracts or can prove circumstances beyond its control in extenuation, will command the business of the big, reputable distributors when the slump does come. They are sowing the seeds of an enormous crop in the fields of non-delivery, in about the proportion that merchants who repudiated contracts something over two years ago are receiving scant attention now.

Among the Knitting Mills.

The employees of the Black Cat Textiles Company, Kenosha, Wis., staged an interesting entertainment at the Rhode Opera House at Kenosha on the evening of January 9th. The program consisted of vocal solos and duets, moving pictures and Harrison Fisher pictures enacted by girls selected from the different departments of the hosiery mill. There was also character posing by these girls, representing Martha Washington, Priscilla, Pocahontas, Japanese girls, Queen Louise, Betsy Ross, Marie Antoinette and others. The program ended with a lining up of the various characters across the stage, while a little Italian girl, holding a large live black cat, occupied the center of the line. The whole entertainment was arranged and carried forward by a committee selected from among the employees, and all expenses were paid by the Black Cat Textiles Company. The attendance was so large that the program had to be repeated to accommodate the people. This entertainment is but one of many features which the Black Cat Textiles Company has adopted for the enjoyment and improvement of its employees.

The Wilson Hosiery Mills, Chattanooga, Tenn., have filed a change of corporate title to the Chattanooga Spinning Co. The directors of the company are: John H. Wilson, John L. Wray, John D. Key and Paul Campbell.

The Fidelity Hosiery Mills Company, Newton, N. C., in its annual meeting declared a dividend of 10 per cent. A 125-horsepower boiler is to be installed at once and eight

more knitting machines, increasing the number of machines to a total of 211.

The Musgrove Knitting Company of Pittsfield, Mass, made a general advance in wages of 10 per cent, commencing January 3rd. This company manufactures misses' and children's ribbed underwear.

At a meeting of the directors of the Mechanicsville Knitting Co., Mechanicsville, N. Y., held recently, it was decided to give all operatives who had been in the employ of the company for a year or more a bonus equivalent to practically four weeks' pay. E. H. Strong, president and general manager has commenced his twenty-fifth year of connection with this company.

The Griffin (Ga.) Hosiery Mill will add 35 knitting machines.

Clifford Friar and Clyde Keene, of the Tennessee Textile mills, have gone to New York City to buy machinery for the proposed new hosiery factory in Alton Park, Tenn. The company has been tentatively organized. The name, "Lookout Hosiery Mills," originally was selected, but on account of the common use of "Lookout" by Chattanooga manufacturers, the promoters changed the name of their company. A contraction of the new name will be used as a trade mark—"Ten-Tex"—for the hosiery to be manufactured. One hundred hosiery knitting machines are to be purchased. The Cedar Products company's plant has been acquired by the company.

The Lookout Knitting Mills company, Chattanooga, Tenn., is equipping its plant in one of the Chattanooga Bottling company's buildings, which the new company has acquired by lease. The mill building is three stories high and covers a space of 140x60 feet. It is built of concrete. The dyehouse is 50x30 feet on the ground. Men's union suits will be manufactured. The plant will start out with twelve knitting machines and a complement of sewing machines and finishing equipment, all of which will be electrically driven. The initial factory equipment investment is reported unofficially to be $30,000. The daily capacity of the plant is rated at from 100 to 150 dozen pairs of union suits. The Lookout Knitting mills was incorporated a few weeks ago and has been organized with E. B. Thomasson, president; A. S. Revierie, vice president, and E. M. Thomasson, secretary and treasurer.

Another new factory for the making of fine hosiery for men and women's wear has been opened in Frankford, Philadelphia, Pa. It has in operation by steam power 30 knitting machines, 2 sewing machines and 2 looping machines, one dry box and a press.

Julian S. Carr, Jr., president of the Durham (N. C.) Hosiery Mill, has purchased a building near the mill, and plans are being made to convert this into a community building. W. A. Bryan, a former school principal, will supervise the community work in the remodeled building, which will be equipped with a library and reading rooms. An assembly room will be provided where the women folk may hold meetings. Recreation and amusement will be provided for the children. An office will also be maintained by the health nurse of the hosiery mill.

The Ridgeview Hosiery Mill Co., Newton, N. C., is reported to be contemplating the installation of additional machinery and the erection of several houses in its mill village.

The Bay State Knitting Co., of Boston, is a new knitting mill just started for the manufacture of high-grade shaker sweaters and ladies' full fashioned sweaters. The company is owned by Messrs. M. & J. Pelton.

The Ellerbe (N. C.) Knitting Mills, recently incorporated with a capital of $100,000, $25,000 paid in, will manufacture women's hosiery to start, although other lines may be turned out later. W. L. Howell is president, and J. R. Bennett, secretary and treasurer of the concern.

E. G. Morrison, Lawndale, N. C., plans to build hosiery knitting mill.

The Amos Hosiery Mills, High Point, N. C., have organized with Nescott Roberson, president; Chas. T. Amos, vice president; R. T. Ames, secretary-treasurer. It will erect 100x100 ft. mill construction building, costing $10,000; install 40 knitting machines, electric drive, etc., costing $15,000; daily capacity 400 doz. pair hosiery.

Chas. B. Scarborough, of Conway, S. C., has organized a company and will operate 10 knitting machines, electric drive; daily capacity, 50 dozen pairs hose.

The Richmond Hosiery Mills, at Rossville, Ga., are adding 150 Scott & Williams, Model K, 260 needle machines to their present equipment. They are also building a new building to accommodate the drying equipment of the plant and a new boiling kier is being installed.

A. L. Shuford, of Conover, N. C., has a site and will erect a suitable building, provided he can get some parties interested who would either move their used machinery there or would be willing to go into a new proposition, either Turkish towels or some knitting product.

A. L. Patterson, secretary and treasurer of the Lillian Knitting Mills, Albermarle, N. C., has just announced that his company has given the contract and is putting the materials on the ground for a commodious boarding house and dormitory for the young ladies who are operatives of the Lillian Mills. There will be from 15 to 20 rooms in this building and it will be modern in every particular with electric lights, hot and cold water and steam heat. The building will be in charge of a lady manager, and will be exclusively for the young ladies who are his operatives. Board and room will be furnished these young ladies at the lowest possible cost.

The hosiery mill of H. A. Romberger Manufacturing Co., Middletown, Pa., was destroyed by fire Jan. 2. The loss is estimated at about $150,000.

The Clark Knitting Co., Utica, N. Y., recently incorporated with a capital of $21,000, has started operations with a force of about 150 operatives. The product is women's, men's and children's cotton knit underwear, and the mill is equipped with 25 knitting and 100 sewing machines, operated by electric power.

The Fuld & Hatch Knitting Co., Cohoes, N. Y., is considering the erection of a six-story storehouse.

The Anthony Hosiery Mills, Fort Wayne, Ind., have added 24 knitting machines, 4 looping machines, 1 dry box and a steam press to their former equipment of 32 knitting machines, 2 ribbers, 8 loopers and 2 sewing machines. Within the next six months these mills expect to double the present output, which is 100 dozen per day.

It is reported that the Marshall Field company will build a model manufacturing town at Koehler, Henry county, Va. A railway official is quoted as saying that no

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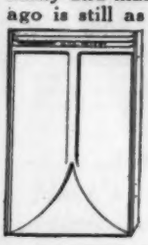

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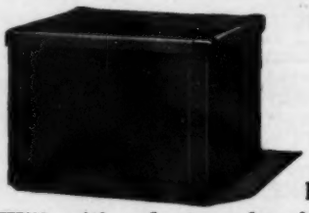

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work would be done towards developing the 1,200-acre tract of land recently purchased, until the improvements now under way at Leaksville, N. C., have shown further progress, but, it is believed that ground will be broken at Koehler towards the end of the summer for the erection of a knitting mill. Valuable water power rights have been acquired by the Marshall Field company, and, it is said the contracts for the construction of 500 houses for employes have been already let.

A Perfect Underwear Seam.

It is supposed that knitting was known to the Ancients, although there is no direct evidence, the first historic mention being about the time of Henry the Fourth of England. In ancient times the leg was generally left uncovered, and, when stockings were first worn, they were cut with scissors from cloth of linen, woolen, or silk, and sewed together. Thus, our early ancestors struggled with the difficulty that has been passed down through the ages, first in hosiery and then in underwear, viz., a perfect seam.

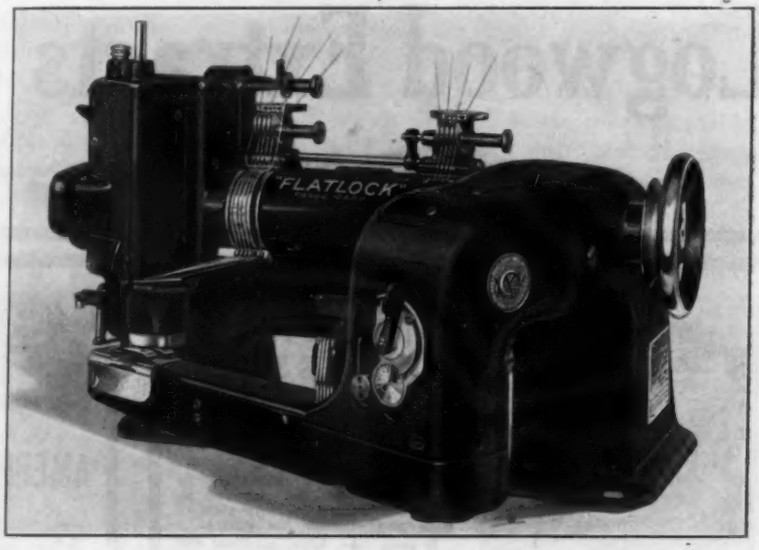
While the seams of our forefathers answered their purpose in strength and durability, they were unsightly and decidedly uncomfortable. When it became the vogue to wear knitted undergarments, many efforts were directed not only to the rapid production of these under-garments by the use of suitable knitting machinery, but also to improvements in the appearance of the seams which joined the various parts of these garments to one another. The unsightly and uncomfortable scissor-cut edges received early attention, and machines to improve on this were brought forth.

While many machines continued to be invented, and numberless improvements were made in existing conditions, it was not until Flatlock Seam was patented, March 31, 1908, that a perfect union of abutted cut edges, forming a very strong, soft and smooth flat seam that was as thin as the fabric itself, was produced. This seam is so smooth on the inside of the garment that it can be worn without leaving a mark or crease upon the most tender flesh. Moreover, not only is the "appearance" and "feel" of the Fatlock patented seam all that can be desired, but the strength of this seam, even with sheer fabric, is beyond criticism.

Illustrated herewith, is the high speed Fatlock machine as seen from the exterior. The stitch forming implements are not shown, but enough is revealed in the general construction of the machine to indicate simplicity and originality of design, which, in fact, are the usual distinguishing features of the products of the engineering staff of the Willcox & Gibbs Sewing Machine Co. Those who appreciate fine mechanism will find much in the machine to command their admiration, not only as to its unique and beautiful lines, but also as to the careful and convenient arrangement of all the working details. One of these details, for example, is the novel method of "feeding off" the arm of the machine when closing the lengthwise seam of the sleeve or leg of the garment. This results in a material saving of labor, because it is no longer necessary to withdraw the tube from the arm after it has been seamed, as it drops from the machine completed.

In operation the girl feeds the knitted material to the machine with one hand on the right side, and her other hand on the left side of the arm. The trimmer blades moving in a horizontal plane trim off the projecting edges of the fabric, and simultaneously the cut edges are stitched and securely interlocked. The resultant flat seam as it leaves the machine is a finished product and does not require any supplemental stitching. Furthermore, this Flatlock Seam is made in one operation and will neither ravel nor rip.

As a proof of the desirability of garments finished with the Flatlock Seam, over 20,000,000 knitted garments, chiefly union suits, have been seamed and sold to the trade in this country alone.



Among the Southern mills utilizing the Flatlock machines may be mentioned the Lewis Jones Knitting Co., Winchester, Va.; the P. H. Hanes Knitting Co., Winston-Salem, N. C.; J. C. Roulette & Sons Co., Hagerstown, Maryland, and The Collier Manufacturing Co., Barnesville, Ga. While the mills mentioned are all located in the South, many mills in the North use the Flatlock equipment, among which may be mentioned the Harvard Knitting Mills, Wakefield, Mass.; Wm. Carter, Springfield, Mass.; the Utica Knitting Co., Oneita Knitting Co., and Mohawk Valley Cap Factory, Utica, N. Y.; Charles Stretton & Sons Co., Stoughton, Mass., and the Black Cat Textiles Co., Bennington, Vt.

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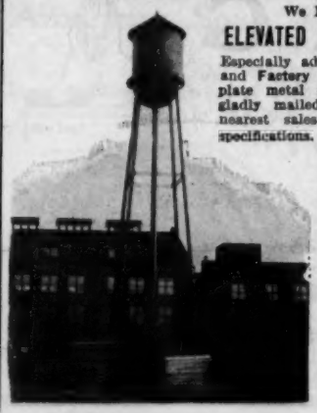

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Link-Belt Company.

Bleacheries.
(See Dyers, Bleachers and Finishers.)

Bleaching Kiers.
Allen Sons Co., Wm.
Butterworth & Sons Co., H. W.
Philadelphia Drying Machy. Co.
Textile Finishing Machinery Co., The.
Worcester Steam Boiler Wks.

Bleaching Machinery.
American Laundry Machinery Co., The
Butterworth & Sons Co., H. W.
Cocker Mchy. & Foundry Co.
Delahunty Dyeing Machine Co.
Electro Chemical Co.
Franklin Process Co.
Philadelphia Drying Machy. Co.
Tolhurst Machine Works.
Smith, Drum & Co.

Bleaching Materials.
Baltic Chemical Co.
Bosson & Lane.
Brown & Bro., B.
Chemical Co. of America.
Cone, Frederick H.
Electro Bleaching Gas Co.
Electro Chemical Co.
Electric Smelting & Alum. Co.
Formen Trading Co.
Madero Bros.
Marden, Orth & Hastings Co.
Moore Oil Co.
National Aniline & Chemical Co.
Seydel Mfg. Co.
Southern Chemical Lab.
Wolf & Co., Jacques.

Blowers and Blower Systems.
Carrier Eng. Corp.
General Electric Co.
Howard & Morse.
Leigh & Butler.
New York Blower Co.
Ohio Blower Co.
Philadelphia Drying Mach. Co.
Westinghouse Elec. & Mfg. Co.

Boards—Form.
Pearson, Jos. T.
Textile Finishing Mch Co.

Bobbins.
Draper Co.
Jordan Mfg. Co.
Leigh & Butler.
Shambow Shuttle Co.

Bobbin Painting Machines.
Blandin Co.

Boilers.
Casey-Hedges Co.
Chattanooga Boiler & Tank Co.
Chicago Bridge & Iron Co.
Lombard Iron Works & Supply Co.
Schofield's Co., J. S.
Toomey, Frank.
Walsh & Weidner Boiler Co.

Boiler Feed Water Purification.
(See Water Softeners.)

Boiler Graphite.
Jos. Dixon Crucible Co.

Box Strapping and Tie Buckles.
Acme Steel Goods Co.
Cary Mfg. Co.
Draper Co.
Signode System, Inc.

Boxes (Fibre).
Columbus Truck & Supply Mfg. Co.
Diamond State Fibre Co.
Fibre Specialty Co.
Keystone Fibre Co.
Leatheroid Mfg. Co.
Standard Fibre Co.

Bronze Work.
Chattanooga Iron Works.

Brushes (Mill).
Curtis & Marble Machine Co.
Felton Brush Co., D. D.
Felton, S. A. & Son Co.

Brushes (Commutator).
Dixon Crucible Co., Jos.
General Elec. Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Buckets (Elevator and Grab).
Link-Belt Company.

Buckles (Cotton Tie).
(See Box Strappings and Ties.)

Building Contractors.
(See Architects & Engineers.)

Building Material.
Barrett Co., The
Birmingham Slag Co.
Chattanooga Iron Works.
Chattanooga Boiler & Tank Co.
Chicago Bridge & Iron Co.
Cyclone Fence Co.
Dufur & Co.
General Roofing Mfg. Co.
Mississippi Wire Glass Co.
Stewart Iron Works Co.
Wadsworth, Howland & Co.

Burr Pickers.
Curtis & Marble Machine Co.
Sargent's, C. G., Sons.
Smith & Furbush Machine Co.

Bushings, Graphite and Bronze—Oil-less.
Bound Brook Oil-less Bearing Co.

Calling System.
National Scale Co.

Cam Device & Patch.
Clinton Cam Co.

Cans—Roving.
Columbus Truck & Supply Mfg. Co.
Diamond State Fibre Co.
Fibre Specialty Co.
Keystone Fibre Co.
Leatheroid Mfg. Co.
Standard Fibre Co.

Cars and Trucks—Fibre.
(See Trucks).

Carbonizing Machines.
Philadelphia Drying Machy. Co.
Phila. Textile Mchy. Co.
Sargents Sons & Co., C. G.
Textile Finishing Machinery Co., The.

Carding Machinery.
Howard & Bullough.
Hubbard Machine Co.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.

Card Cleaner.
Lehnert Textile Co.

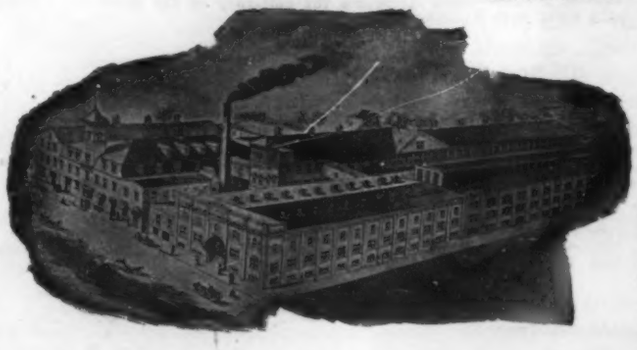
Card Clothing.
Howard & Bullough.
Leigh & Butler.
Saco-Lowell Shops.

Card Feeds.
Schofield, Wm. & Co.
Smith & Furbush Mach. Co.

Card Grinding Machinery.
Lehnert Textile Co.
Leigh & Butler Co.
Roy & Sons Co., B. S.
Smith & Furbush Mch. Co.

Card Mounting Apparatus.
Lehnert Textile Co.

Emmons Loom Harness Co.



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Slasher and Striking Combs, Warper and Leice Reeds, Beamer and Dresser Hecks, Mending Eyes, Jacquard Heddles.

LAWRENCE, ... MASS

BUYERS' INDEX—Continued.

Carpet Machinery.
Butterworth, H. W. & Sons Co.
Crompton & Knowles Loom Wks.
Philadelphia Drying Machy. Co.
Phila. Textile Machy. Co.
Schofield, Wm. & Co.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

Carrier Aprons.
(See Aprons).

Castings—Mill.
Greenville Iron Works.
West Point Iron Wks.

Caustic Soda.
(See Soda—Textile.)

Cement Machinery.
Allis-Chalmers Mfg. Co

Cement and Brick Coating.
High Grade Mfg. Co.
Wadsworth, Howland & Co.

Central Stations.
Alabama Power Co.
Augusta-Aiken Railway & Elec. Corp.
Central Georgia Power Co.
Columbus Power Co.
Georgia Railway & Power Co.

Chain Drives
Link-Belt Company.

Chairs—Office.
Baylis Office Equip. Co.

Checks (Metal).
(See Stamps, Stencils, etc.,

Chemicals.
(See Dyestuffs and Chemicals.)

Chlorine Gas.
Electro Bleaching Gas Co.

Clocks—Hank, Etc.
(See Counters.)

Clocks—Tower.
Howard Clock Co., E.

Closets—Water.
(See Toilets.)

Cloth Cutters
Firsching, J. A.
Wildman Mfg. Co.
Windle, J. E.

Cloth Doubling Machinery.
Curtis & Marble Mch. Co.
Windle, J. E.

Cloth Expanders.
Windle, J. E.

Cloth Measurer.
(See Measuring Machine.)

Cloth Room Machinery.
Butterworth, H. W. & Sons Co.
Curtis & Marble Mach. Co.
Elliott & Hall.
Firsching, J. A.
Hunter Mch. Co., Jas.
Saco-Lowell Shops.
Smith, Drum & Co.
Textile Finishing Machinery Co., The.
Wildman Mfg. Co.
Windle, J. E.

Cloth Shrinking Machinery.
Reliance Machine Works.

Cloth Tubes.
(See Tubes—Cloth Protecting.)

Cloth Winders.
(See Winders).

Clutches (Friction).
Cork Insert Co.
Hunter Mch. Co., Jas.
Link-Belt Company.
Seeger-Walraven Co.
Transmission Ball Bearing Co.

Coal & Coke.
Chesapeake & Ohio Coal & Coke Co.

Coal Driers (Centrifugal).
Link Belt Company.

Coal Handling Machinery.
Hunt Co., C. W.
Link-Belt Company.

Coal Tar Disinfectants.
See Disinfectants.

Colors.
(See Dyestuffs and Chemicals.)

Com Aprons.
(See Aprons.)

Commission Merchants and Dealers.
(See Cotton Cloth Commission Merchants.)

Compressors (Air).
Allis-Chalmers Mfg. Co.
General Electric Co.
Seeger-Walraven Co.

Condensers.
Allis-Chalmers Mfg. Co.
Seeger-Walraven Co.

Cones—Paper.
(See Tubes—Cloth Protecting.)

Contractors
(See Architects and Engineers.)

Conveying Machinery.
Excelsior Pulley Co.
Hunt Co., C. W.
Leigh & Butler.
Link-Belt Company.
Philadelphia Drying Mach. Co.
Philadelphia Textile Mchry Co.
Saco-Lowell Shops.
Schofield, Wm. & Co.
Seeger-Walraven Co.
Smith & Furbush Mach. Co.

Coolers.
(See Humidifying Apparatus.)

Cooling (Condensing Water).
Spray Eng. Co.

Copper Stamps and Stencils.
(See Stamps, Stencils, Etc.)

Cordage Machinery.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co., The.

Cork Insert Pulleys.
(See Pulleys—Cork Insert.)

Cotton Cloth Commission Merchants and Dealers.
Armory Browne & Co.
Fawcett, Hughes.
Paulson, Linkroum & Co.
Salkeld & Bro. A. D.
Weimer Bros.
Woodward, Baldwin & Co.

Cotton Dealers and Brokers.
Beer, H. & B.

Cotton Machinery.
Barber-Colman Co.
Butterworth & Sons, H. W.
Cocker Mch. & Foundry Co.
Columbus Truck & Supply Mfg. Co.
Cramer, Stuart W.
Crompton & Knowles Loom Wks.
Curtis & Marble Mach. Co.
Delahunty Dyeing Mach. Co.
Draper Co.
Elliot & Hall.
Firsching, J. A.
Howard & Bullough.
Hunter Mch. Co., Jas.
Leigh & Butler.
Phila. Drying Mchy. Co.
Phila. Textile Machy. Co.
Sargent's Sons, Corp., C. G.
Saco-Lowell Shops.
Schofield & Co., Wm.
Smith, Drum & Co.
Smith & Furbush Mach. Co.
Stafford Co., The
Textile Finishing Machinery Co., The.
Whitinsville Spinning Ring Co.

Coupling—Bale Strapping.
Signode System, Inc.

Coupling—Rope.
Hunt Co., C. W.

Counters—Revolution, Hank, Pick, Etc.
National Scale Co.
Root Co., C. J.
Veeder Mfg. Co.

Cranes (Locomotive).
Link-Belt Company.

Crayons.
American Crayon Co.
Dixon Crucible Co.

Crushing Machinery.
Allis-Chalmers Mfg. Co.

Cuspidors.
Baylis Office Equip. Co.
Wolfson Tray Co.

Cutters (Cloth).
(See Cloth Cutters.)

Dies (Steel).
(See Stamps, Stencils, Etc.)

Disinfectants.
Barrett Co., The.

Dobby Chains.
Crompton & Knowles Loom Wks.

Doffing Boxes (Fibre).
(See Boxes—Fibre.)

Drawing Frames.
Howard & Bullough.
Saco-Lowell Shops.

Drills—Electric.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Drives for Cylinders.
Cohoes Foundry & Mch. Wks.

Drying Machinery.
Butterworth, H. W. & Sons Co.
Cocker Mch. & Foundry Co.
Hunter Mch. Co., Jas.
Phila. Drying Machy. Co.
Phila. Textile Machy. Co.
Sargent's Sons Corp., C. G.
Textile Finishing Machinery Co., The.

Dust Collectors.
(See Blowers and Blowing Systems.)

Dusting Machinery.
Schofield Co., Wm.
Smith & Furbush Mach. Co.

Dyers, Bleachers and Finishers.
Aberfoyle Mfg. Co
Franklin Process Co.
Home Bleach & Dye Works.

Dyeing, Bleaching and Finishing Machinery.
American Laundry Machinery The
Butterworth & Sons Co., H. W.
Cocker Mch. & Foundry Co.
Cohoes Iron Foundry & Mch. Co.
Columbus Truck & Supply Mfg. Co.
Curtis & Marble Co.
Delahunty Dyeing Machine Co.
Elliot & Hall.
Electro Bleaching Gas Co.
Electro Chemical Co.
Firsching, J. A.
Franklin Process Co.
Hunter Mch. Co., Jas.
Klipstein & Co.
Leigh & Butler.
Phila Drying Machy. Co.
Phila. Textile Machy. Co.
Reliance Machine Works.
Smith, Drum & Co.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

Dye Sticks.
Phila. Drying Machy. Co.

Dyestuffs and Chemicals.
Aberfoyle Mfg. Co.
Arabol Mfg. Co.
Baltic Chemical Co.
Bayer Co.
Bosson & Lane.
Brown & Bro., B.
Chemical Co. of America.
Cone, Frederick H.
Dicks David & Broadfoot, Inc.
Emmons Loom Harness Co.
Electro Bleaching Gas Co.
Farbwerke, Hoechst & Co.
Formen Trading Co.
Gismond & Co., Inc., Jas. G.
Holland Aniline Co.
Klipstein & Co., A.
Lewis, John D.
Madero Bros.
Marden Orth & Hastings Co.
National Aniline & Chemical Co
Seydel Mfg. Co.
Standard Aniline Products Co.
Southern Chemical Lab.
Sykes & Co., Walter F.
White Chemical Co.
Wolf & Co., Jacques.

Electric Dynamos and Motors.
(See Motors and Generators.)

Electric Lamps.
(See Lamps.)

Electrical Machinery and Supplies.
Allis-Chalmers Mfg. Co.
General Electric Co.
Lincoln Elec. Co.
Seeger-Walraven Co.
Stuart-Howland Co.
Walsh & Weidner Boiler Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.

Electric Trucks (Inter-Transportation).
(See Trucks—Electric.)

Elevators and Conveyors.
Cohoes Iron Foundry & Mch. Co.
Hunt Co., C. W.
Link-Belt Company.
Seeger-Walraven Co.

Engineers, Consulting.
(See Architects.)

Engines (Oil, Gas and Gasoline).
Seeger-Walraven Co.

Engines (Steam).
Allis-Chalmers Mfg. Co.
Lombard Iron Works & supply Co.
Schofield's Sons Co., J. S.
Seeger-Walraven Co.
Toomey, Frank.
Walsh & Weidner Boiler Co.

Expanders (Cloth).
(See Cloth Expanders.)

Extractors—Hydro.
American Laundry Mchy. Co. The
Tolhurst Machine Works

Farbwerke-Hoechst Company

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Charlotte, 210 S. Tryon St. Montreal, 45 Alexander St.

BUYERS' INDEX—Continued.

Fans—Electric.
Allis-Chalmers Mfg. Co.
General Electric Co.
Howard & Morse.
Lincoln Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

Fans—Conveying, Power and Exhaust.
(See Blowers and Blowing Systems.)

Feed Water Purifiers.
(See Water Softeners.)

Felting Machinery.
Smith & Furbush Mach. Co.

Fence—Steel and Iron.
Cyclone Fence Co.
Stewart Iron Works.

Filing Cabinets & Systems.
Baylis Office Equip. Co.

Filters (Water).
(See Water Softening.)

Finishing.
(See Dyers, Bleachers and Finishers.)

Finishing and Sizing Materials.
Aberfoyle Mfg. Co.
American Soap & Washoline Co.
Baltic Chemical Co.
Bosson & Lane.
Brown & Bro., B.
Chemical Co. of America.
Cone, F. H.
Corn Products Refining Co.
Electro Bleaching Gas Co.
Electric Smelting & Alum. Co.
Former Trading Co
Klipstein & Co., A.
Madero Bros.
Marden, Orth & Hastings.
Moore Oil Co.
National Aniline & Chemical Co.
Seydel Mfg. Co.
Southern Chemical Lab.
Standard Aniline Products Co.
Wolf & Co., Jacques.

Fire Extinguishers.
Missouri Lamp & Mfg. Co.
Pyrene Mfg. Co.

Fire Hose.
(See Hose—Fire.)

Fire Protecting Paint.
(See Paint—Fireproof.)

First Aid Room Equipment.
(See Hospital Equipment.)

Fluted Rolls.
Howard &Bullough.
Saco-Lowell Shops.
Schofield's Sons Co., J. S.
Smith & Furbush Machine Co.

Flyers.
Howard & Bullough.
Leigh & Butler.
Saco-Lowell Shops.

Folding Machines (Cloth).
Curtis & Marble Mach. Co.
Elliott & Hall.
Windle, J. E.

Friction Clutches.
(See Clutches—Friction.)

Fulling Mills for Woolen Goods.
American Laundry Mchy. Co.
Hunter Mch. Co., Jas.

Furniture—Office.
Baylis Office Equip. Co.

Fuses.
Economy Fuse & Mfg. Co.
General Elec. Co.
Western Electric Co.

Garnett Machines.
Hunter Mch. Co., Jas.
Leigh & Butler.
Smith & Furbush Mach. Co.

Gas Engines.
(See Engines—Gas.)

Gaskets—Fibre.
Diamond State Fibre Co.

Gaskets—Rubber.
Goodrich Co., B. F.

Gears (Silent).
Diamond State Fibre Co.
General Electric Co.
Western Electric Co.

Generators (Electric).
(See Motors and Generators.)

Glass (Wire).
Mississippi Wire Glass Co.

Grain Bags.
American Supply Co.

Grease.
(See Lubricants.)

Grinders (Card).
(See Card Grinding Machinery.)

Gummed Tape and Moistening Machine for Slashers.
Papco Paper Products Co.

Gums.
(See Finishing and Sizing Materials.)

Hangers.
(See Shafting and Hangers.)

Harness—Loom.
American Supply Co.
Crompton & Knowles Loom Wks.
Emmons Loom Harness Co.
Garland Mfg. Co.

Heating and Ventilating Apparatus
(See Ventilating Apparatus.)

Heddles.
Crompton & Knowles Loom Wks.
Draper Co.

Heddle Frames.
Crompton & Knowles Loom Wks.

Hoist (Electric).
Link-Belt Company.
Seeger-Walraven Co.

Hose—Air.
Goodrich Co., B. F.

Hose (Fire).
Goodrich Co., B. F.

Hose—Steam.
Goodrich Co., B. F.

Hose—Water.
Goodrich Co., B. F.

Hosiery Finishing Boards.
(See Boards.)

Hospital Equipment.
Retz, Frank S.
White Chemical Co.

Hotels.
Martinique.
Tuller.

Humidifying Apparatus.
Carrier Eng. Corp.
Cramer, Stuart W.
Spray Eng. Co.

Hydraulic Turbines.
(See Turbines Steam.)

Hydro Extractors.
(See Extractors.)

Indigo.
(See Dyestuffs and Chemicals.)

Ink (Stencil).
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.
Dixie Seal & Stamp Co.

Ink—Writing.
Baylis Office Equip. Co.

Iron Work—Ornamental.
Chattanooga Iron Works.
Chicago Bridge & Iron Wks.
Cyclone Fence Co.
Dufur & Co.

Jacquards.
Crompton & Knowles Loom Wks.

Jute Bagging Machines.
Smith & Furbush Mach. Co.

Kiers.
(See Bleaching Kiers.)

Knit Goods Washers.
(See Washers—Cloth.)

Knitting Machinery.
Boss Knitting Mach. Works.
Brinton Co., H.
Hemphill Mfg. Co.
Nye & Tredick Co.
Scott & Williams.
Stafford & Holt
Smith & Furbush Mach. Co.
Wildman Mfg. Co.

Lace Leather.
Graton & Knight Mfg. Co.

Lamps—Incandescent and Arc.
Boston Economy Lamp Division.
General Electric Co.
Stuart-Howland Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.
Westinghouse Lamp Co.

Lappers.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.

Laundry Machinery.
American Laundry Mchy. Co.
The Tolhurst Machine Works.

Leather Belting.
(See Belting—Leather.)

Linen Yarns.
(See Yarns—Linen.)

Link Belting.
(See Belting—Link.)

Liquid Chlorine.
(See Chlorine.)

Loaders (Wagon and Truck).
Link-Belt Company.

Logwood Extract.
(See Dyestuffs and Chemicals.)

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Crompton & Knowles Loom Wks.
Draper Co.
Saco-Lowell Shops.
Schofield, Wm. & Co.
Stafford Co., The
Loom Harness Straps.
Graton & Knight Mfg. Co.
Lubricants.
Dixon, Jos., Crucible Co.
Floto Mica Sales Co.
Kellogg & Co., E. H.
Moore Oil Co.
N. Y. & N. J. Lubricant Co.
Lug Straps.
(See Straps—Lug.)
Lumber.
Salkeld, A. D. & Bro.
Marking Pots, Stencils, Ink, Etc.
(See Ink—Stencil.)
Measuring Machine (Cloth).
Elliot & Hall.
Windle, J. E.
Mercerized Yarns.
(See Yarns Mercerized.)
Mercerizers.
Aberfoyle Mfg. Co.
Home Bleach & Dye Works.
Mercerizing Machinery.
Butterworth, H. W. & Sons Co.
Smith, Drum & Co.
Textile Finishing Machinery Co.
Wolf & Co., Jacques.
Meters—Revolution, Etc.
(See Counters.)
Meters (Flow, Air, Gas, Steam).
Allis-Chalmers Mfg. Co.
General Electric Co.
Lincoln Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.
Mill Baskets and Boxes.
(See Boxes—Fibre.)
Mill White Paint.
(See Paint—Mill White.)
Millwrights.
Hunter Mch. Co., Jas.
Motors and Generators (Electric).
Allis-Chalmers Mfg. Co.
General Electric Co
Lincoln Electric Co.
Seeger-Walraven Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.
Mule Stands.
Transmission Ball Bearing Co.
Napping Machinery.
Curtis & Marble Mch. Co.
Leigh & Butler.
Office Supplies, Furniture, Etc.
Baylis Office Equip. Co.
Oils—Finishing.
(See Finishing and Sizing Materials.)
Oils—Lubricating.
(See Lubricants.)
Openers for Cotton, Wool, Waste Etc.
Leigh & Butler.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Oxidizing Machinery.
Phila. Drying Machinery Co.
Oxygen.
Bird Wilcox Co.
Prest-O-Lite Co.
Packings—Leather.
Graton & Knight Mfg. Co.
Packings—Rubber.
Goodrich Co., B. F.
Paint.
Barrett Co., The.
Chaffee, Thos. K.
General Roofing Mfg. Co.
Ullman-Philpott Co.
Wadsworth-Howland & Co., Inc.
Wolf Paint Co., Leon L.
Paint—Fireproof.
General Roofing Mfg. Co.
High Grade Mfg. Co.
Wadsworth-Howland & Co., Inc.
Wolf Paint Co., Leon L.
Paint—Mill White.
Chaffee, Thos. K.
Ullman-Philpott Co.
Wadsworth-Howland & Co., Inc.
Wolf Paint Co., Leon L.
Perforated Metal.
(See Screens and Sieves.)
Picking Machinery.
Curtis & Marble Mach. Co.
Howard & Bullough, Am. Machine Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Smith & Furbush Mach. Co.
Pickers—Curled Hair.
Schofield, Wm. & Co.
Smith & Furbush Mach. Co.
Picker Housings.
Hubbard Mch. Co.
Pickers—Leather.
Garland Mfg. Co.
Graton & Knight Mfg. Co.
Picker Sticks.
Garland Mfg. Co.
Pipe Threading & Cutting Machines
Seeger-Walraven Co.
Power Companies.
(See Central Stations.)
Power Transmission.
Allis-Chalmers Mfg. Co.
American Pulley Co.
Bound Brook Oil-less Bearing Co.
Cork Insert Co.
Excelsior Pulley Co.
Freadrich Belting Co.
General Electric Co
Graton & Knight Mfg. Co.
Goodrich Co., B. F.
Hunter Machine Co., Jas.
Link-Belt Company.
Seeger-Walraven Co.
S. K. F. Ball Bearing Co.
Textile Specialty Co.
Transmission Ball Bearing Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.
West Point Iron Works.
Press Papers.
Diamond State Fibre Co.
Phila. Drying Machinery Co.
Press Rolls.
Cohoes Iron Foundry & Mch. Co.
Presses.
American Laundry Mchy. Co. The
Butterworth & Sons Co., H. W.
Curtis & Marble Mch. Co.
Economy Baler Co.
Phila. Drying Machinery Co.
Reliance Machine Works.
Seeger-Walraven Co.
Smith, Drum & Co.
Smith & Furbush Mch. Co.
Textile Finishing Machinery Co., The.
Pulleys.
American Pulley Co.
Cork Insert Co.
Excelsior Pulley Co.
Link-Belt Company.
Seeger-Walraven Co.
Transmission Ball Bearing Co.
West Point Iron Works.
Pulleys (Cork Insert).
American Pulley Co.
Cork Insert Co.
Pumps.
Allis-Chalmers Mfg. Co.
Cohoes Iron Foundry & Mch. Co.
Seeger-Walraven Co.
Textile Finishing Machinery Co., The.
Toomey, Frank.
Walsh & Weidner Boiler Co.
Westinghouse Elec. & Mfg. Co.
Railings.
Chattanooga Iron Works.
Dufur & Co.
Railways—Industrial.
(See Trucks—Electric.)
Railways.
Southern Railway.
A. & W. P. Railway.
Central of Ga. Railway.
Georgia Railroad.
Reeds.
American Supply Co.
Emmons Loom Harness Co.
Reels.
Crompton & Knowles Loom Wks.
Draper Co.
Saco-Lowell Shops.
Schofield Co., Wm.
Repairing (Textile of all kinds).
Greenville Iron Works.
Hubbard Mch. Co.
Rewinding Machines.
Curtis & Marble Machine Co.
Windle, J. E.
Rib Top Cutters.
Wildman Mfg. Co.
Ring Travelers—Steel and Bronze
Union Mfg. Co.
Whitinsville Spinning Ring Co.
Rings—Spinning.
(See Spinning Rings.)
Rocker Shaft Bearings.
(See Bearings.)
Roller Covering.
Goodrich Co., B. F.
Graton & Knight Mfg. Co.
Roofing.
Barrett Co., The.
Cortright Metal Roofing Co.
General Roofing Mfg. Co.
Roof and Cement Coating.
General Roofing Mfg. Co.
High Grade Mfg. Co.
Wadsworth, Howland & Co., Inc.
Rope—Transmission.
Hunt Co., C. W., Inc.
Hunter Mch. Co., Jas.
Link-Belt Company.
Roving Cans & Trucks.
(See Cans—Roving.)
Roving Machinery.
Howard & Bullough.
Saco-Lowell Shops.
Rubber Products.
Goodrich Co., B. F.
Rubber Stamps.
(See Stamps, Stencils, Etc.)
Saddles and Stirrups.
Dixon Lub. Saddle Co.
Saddles—Oil-less.
Bound Brook Oil-less Bearing Co.
Scales—Automatic.
American Kron Scale Co.
Toledo Scale Co.
Screens & Sieves (Perforated)
Erdle Perforating Co.
Link-Belt Company.
Screws (Safety Set).
Allen Mfg. Co.
Searchlight (Industrial).
Western Electric Co.
Second Hand Machinery.
Seeger-Walraven Co.
Toomey, Frank.
Sewing Machines.
Curtis & Marble Mach. Co.
Merrow Machine Co., The.
Textile Finishing Mchy. Co.
Willcox & Gibbs Sewing Mch. Co
Shaftings & Hangers.
S. K. F. Ball Bearing Co.
Seeger-Walraven Co.
Transmission Ball Bearing Co.
West Point Iron Wks.
Shafting Rings.
Graton & Knight Mfg. Co.
Shelving—Sectional Steel.
National Scale Co.
Shift Plates for changing over Rings.
Union Mfg. Co.
Shingles—Asphalt.
General Roofing Mfg. Co.
Shingles—Metal.
Cortright Metal Roofing Co.
Shuttles.
Crompton & Knowles Loom Wks.
Draper Co.
Shambow Shuttle Co.
Singeing Machinery.
Butterworth & Sons Co., H. W
Curtis & Marble Machine Co.
Phila. Drying Machinery Co.
Smith, Drum & Co.
Textile Finishing Machinery Co., The.
Size Kettles.
Allen Sons Co., Wm.
Butterworth, H. W. & Sons Co.
Cohoes Iron Foundry & Mch. Co.
Howard & Bullough, American Machine Co.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The.
Worcester Steam Boiler Wks.
Size Pumps.
Cohoes Iron Foundry & Mch. Co.
Sizing and Finishing Compounds.
(See Finishing & Sizing Materials.)
Size System.
Keever Starch Co.
Seydel Mfg. Co.
Wolf & Co., Jacques.
Skewers.
Jordan Mfg. Co.
Moore Oil Co.
Slag.
Birmingham Slag Co.
Slashers.
Butterworth & Sons Co., H. W.
Cocker Mch. & Foundry Co.
Cohoes Iron Foundry & Mch. Co.
Howard & Bullough.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The.
Slasher Frictions.
Cohoes Iron Foundry & Mch. Co.
Slasher Tape—Gummed.
Papco Paper Products Co.
Slate Asphalt Roofing.
General Roofing Co.
Slubbers.
Howard & Bullough.
Saco-Lowell Shops.

REPAIRING

MILL MACHINERY OF ANY KIND

If you have any broken machinery that needs repairing, and want the highest quality work at the lowest price we want your business. We make a specialty of reboring engine cylinders, valves, etc.

Our excellent equipment and facilities, combined with skilled workmanship, enables us to turn out quality work at the lowest prices, and assures you satisfaction.

All repairs handled promptly, and shipments made without loss of time.

The cotton mill castings that we make are of the same high quality—in brass, grey iron, etc. Send us samples or blueprints and let us estimate.

Write for full information.

GREENVILLE IRON WORKS, GREENVILLE, S. C

BUYERS' INDEX—Continued.

Soaps.
American Soap & Washoline Co.
Baltic Chemical Co.
Brown & Bro., B.
Chemical Co. of America.
Electric Smelting & Aluminum Co.
Madero Bros.
Marden, Orth & Hastings Co.

Soda (Textile).
Baltic Chemical Co.
Brown & Bro., B.
Chemical Co. of America.
Cone, Frederick H.
Madero Bros.
Marden, Orth & Hastings Co.

Softeners—Cotton.
American Soap & Washoline Co
Aberfoyle Mfg. Co.
Arabol Mfg. Co.
Baltic Chemical Co
Bosson & Lane
Brown & Bro., B.
Chemical Co. of America.
Madero Bros.
Marden, Orth & Hastings.
Moore Oil Co.
Seydel Mfg. Co.
Southern Chemical Lab.
Wolf & Co., Jacques.

Softeners—Water.
(See Water Softeners.)

Spindles.
Draper Company.
Saco-Lowell Shops.

Spindles—Ball Bearing.
Chapman Mfg. Co.
Draper Company.
Howard & Bullough.
Saco-Lowell Shops.
Smith & Furbush Machine Co.

Spinning Rings.
Draper Company.
Howard & Bullough.
Union Mfg. Co.
Whitinsville Spinning Ring Co.

Spinning Tape Specialists.
American Textile Banding Co., Inc.
Barber Mfg. Co.

Spooling Machinery.
Draper Company.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.

Spot Remover—Cotton.
Southern Chemical Laboratory.

Spray Water Cooling System.
Spray Eng. Co.

Sprinkler Tanks.
(See Tanks, Towers, Etc.)

Sprocket Wheels.
Link-Belt Company.

Stamps, Stencils and Stencil Machines.
Atlanta Stamp & Stencil Works.
Bradley Mfg. Co., A. J.
Dixie Seal & Stamp Co.

Stand Pipes.
(See Tanks, Towers, Etc.)

Starch and Gums.
Corn Products Refining Co.
Keever Starch Co.
Seydel Mfg. Co.
Wolf & Co., Jacques.

Steam Engines.
(See Engines—Steam.)

Steam Hose.
(See Hose—Steam.)

Steam Pumps.
(See Pumps—Steam.)

Steam Traps.
(See Traps—Steam.)

Stop Motion.
Crompton & Knowles Loom Wks.
Draper Company.
Wildman Mfg. Co.

Storage Warehouses for Cotton.
(See Warehouses.)

Straps—(Lug).
Freadrich Belting Co.
Goodrich Co., B. F.
Graton & Knight Mfg. Co.

Tacohmeters.
The Foxboro Company.
Veeder Mfg. Co.

Tallow.
(See Finishing Material.)

Tanks, Towers and Tubs.
Allen Sons Co., Wm.
Casey-Hedges Co.
Chattanooga Boiler & Tank Co.
Chicago Bridge & Iron Works.
Lombard Iron Works and Supply Co.
Phila. Drying Machinery Co.
Textile Finishing Machinery Co., The.

Tape and Tape Moistening Machine for Slashers.
Papco Paper Products Co.

Tapes and Braids.
American Textile Banding Co., Inc.
Weimar Brothers.

Telephones—Inter.
National Scale Co.

Temples.
Draper Company.

Tenters.
Butterworth & Sons Co., The.
Textile Finishing Mach. Co.

Thin-Place Preventers.
Clayton & Bentley.
Draper Company.

Thread Guides.
Palmer Co., The I. E.

Toilets.
Cement Products Co.
Dixie Culvert & Metal Co.
Vogel Co., Jos. A.

Transmision (Power).
(See Power Transmission Machinery.)

Traps (Return Steam).
Morehead Mfg. Co.

Travelers—Floating.
Union Mfg. Co.

Trucks—Auto.
Federal Motor Truck Co.
Lewis-Hall Iron Works.

Trucks—Electric.
Hunt Co., C. W.

Trucks—Elevating.
National Scale Co.

Trucks—Mill, Inter-Transportation.
Columbus Truck & Supply Mfg. Co.
Diamond State Fibre Co.
Fibre Specialty Co.
Hunt Co., C. W.
Keystone Fibre Co.
Leatheroid Mfg. Co.
National Scale Co.
Standard Fibre Co.

Tubes—Cloth Protecting.
Southern Novelty Co.

Turbines (Steam).
Allis-Chalmers Mfg. Co.
General Electric Co.
Seeger-Walraven Co.
Western Electric Co.
Westinghouse Elect. & Mfg. Co.

Twisting Machinery.
Draper Company.
Howard & Bullough, American Machine Co.
Leigh & Butler.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.

Valves—Rubber.
Goodrich Co., B. F.

Valves—Steam, Ammonia, Water, Etc.
Foster Engineering Co.
Seeger-Walraven Co.
Toomey, Frank.

Varnishes.
Ullman-Philpott Co.
Wadsworth, Howland & Co.
Wolf Paint Co., Leon L.

Ventilating Apparatus.
Carrier Eng. Corp.
Cramer, Stuart W.
General Electric Co.
Howard & Morse.
New York Blower Co.
Ohio Blower Co.
Sargent's Sons Co., C. G.
Tolhurst Mch. Co.
Western Electric Co.

Warehouses (Cotton Storage).
American Dock Co.

Warp Tying Machines.
Barber-Colman Co.

Warpers and Warping Machinery.
Cocker Mch. & Foundry Co.
Columbus Truck & Supply Mfg. Co.
Crompton & Knowles Loom Wks.
Draper Company.
Howard & Bullough.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.

Washers (Cloth).
American Laundry Machinery Co. The
Butterworth, H. W. & Sons Co.
Cocker Mch. & Foundry Co.
Hunter Mch. Co., Jas.
Philadelphia Drying Mchy. Co.
Phila. Textile Mchry Co.
Textile Finishing Mchry. Co.

Washers, Graphite and Bronze.
Bound Brook Oil-less Bearing Co.

Washers, Leather.
Graton & Knight Mfg. Co.

Washers—Rubber.
Goodrich Co., B. F.

Washers, Wooden, Oil-less.
Bound Brook Oil-less Bearing Co.

Waste Machinery (Cotton).
Howard & Bullough.
Leigh & Butler.
Saco-Lowell Shops.
Sargent's Sons Co., C. G.
Schofield Co., Wm.
Smith & Furbush Mach. Co.

Water Cooling Ponds.
(See Cooling.)

Water Softeners.
Chicago Bridge & Iron Works.
Refinite Co., Inc.
Scaife & Sons Co., Wm. B.

Waterproofing Machinery.
Butterworth, H. W. & Sons Co.
Textile Finishing Machinery Co., The.

Weaving.
Aberfoyle Mfg. Co

Welding Apparatus (Electric Arc).
Lincoln Electric Co.
Westinghouse Elec. & Mfg. Co.

Welding Apparatus (Oxy-acetylene)
Bird-Wilcox Co., Inc.
Prest-O-Lite Co.

Welding—Job.
Bird-Wilcox Co., Inc.

Wheels—Fibre.
Diamond States Fibre Co.
Fibre Specialty Co.
Keystone Fibre Co.
Leatheroid Mfg. Co.
Standard Fibre Co.

White Way Posts.
Greenville Iron Works.

Winding.
Aberfoyle Mfg. Co.
Home Bleach & Dye Works.

Winders.
Crompton & Knowles Loom Wks.
Curtis & Marble Machine Co.
Elliot & Hall.
Firsching, J. A.
Foster Machine Co.
Howard & Bullough, American Machine Co.
Leigh & Butler.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Stafford Co., The
Windle, J. E.

Windows—Wire
Chattanooga Iron Works.

Wire Glass.
(See Glass—Wire.)

Wood Preserver.
General Roofing Mfg. Co.
Lyster Chemical Co.
Wadsworth, Howland & Co.
Wolf Paint Co., Leon L.

Wood Pulleys.
Excelsior Pulley Co.

Woolen Machinery.
Butterworth, H. W. & Sons Co.
Crompton & Knowles Loom Wks.
Curtis & Marble Machine Co.
Draper Company.
Hunter Mch. Co., Jas.
Leigh & Butler.
Schofield Co., Wm.
Phila. Drying Machinery Co.
Phila. Textile Machinery Co.
Sargent's Sons Corp., C. G.
Stafford Co., The
Smith & Furbush Mach. Co.
Textile Finishing Machinery Co. The.

Yarns.
Aberfoyle Mfg. Co.
Hughes Fawcett.
Paulson, Linkroum & Co.

Yarns—Linen.
Hughes Fawcett.

Yarns (Mercerized).
Aberfoyle Mfg. Co.

Yarns—Turkey Red.
Hughes Fawcett.

AMERICAN SUPPLY COMPANY

Providence, R. I.

Manufacturers of Loom Harness, Weaving Reeds,

Oak Tanned Leather Belting, Strapping, Etc.

WE MAKE A SPECIALTY OF HARNESS FOR WARP DRAWING MACHINES

NOTE—No orders too large for our capacity. None too small to receive careful attention.

Classified Opportunities.

EXECUTIVE and manager of hosiery mills and spinning plants, familiar with all detail, desires position with concern requiring such service. I have had 20 years manufacturing experience and have been connected with some of the largest interests in this section. I desire to go South, for I believe it to be the location for big future development. Address Box 8, care COTTON.

WANTED—Position as Overseer of Carding in a large mill. Can furnish good references, and come on short notice. Address Box No. 5, care COTTON.

FOR SALE

A complete cotton spinning plant of 3300 spindles ring spinning frames. Now in full operation. No reasonable offer refused.
Address—

SCHADEWALD MILLS,
3rd & Huntingdon Sts.,
Philadelphia, Pa.

Used Machines For Sale

F. O. B. Atlanta

One 20″ x 12′ Lathe.
One 32″ x 12′ Lathe.
Two 16″ x 10′ Lathe.
One 16″ x 8′ Lathe.
One 24″ Aurora Drill Press with tapping attachment.
One new 1½″ Single Head Landis Bolt Cutter.
New Marvel Power Hack Saws in stock for immediate delivery.
We can equip you in either new or used machinery. Write us.

Seeger-Walraven Company
Machinery and Mill Supplies.
38 W. Alabama St., Atlanta, Ga.

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"Positions Wanted" 3 cents per word per insertion. Minimum charge 50 cents. Payable in advance.

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(When replies are to be received in our care, allow four words for box address)

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APINOL

Ideal Surgical Dressing.

Powerful, Safe, Pleasant.

If your druggist cannot supply you write to us.

Send 10 or 25 cents silver for trial bottle.

WHITE CHEMICAL CO.
WILMINGTON, NORTH CAROLINA

CHEAP BOILER

60 H. P. Horizontal Tubular

CHEAP ENGINE

25 H. P. Horizontal, 10″ x 12″, throttling.

FOR SALE BY

COLUMBIA CLAY COMPANY
COLUMBIA, S. C.

New and Second Hand

ENGINES
Corliss Automatic and Slide Valve

BOILERS
Pumps, Hoisting Engines, Gas and Gasoline Engines.

MACHINE TOOLS
Lathes, Planers, Shapers, Drill Presses, etc.

WOOD WORKING
Planers, Molders, Band Saws, etc.

ELEC. MACHINERY
Dynamos and Motors

AND SUPPLIES OF ALL KINDS

FRANK TOOMEY, Inc.,
127-31 N. Third St.
Philadelphia, - Pennsylvania

Commission Merchants, Yarn Dealers, Cotton Dealers and Brokers, Etc.

Weimar Bros.

Phone Connections
Works, 2046-48 Amber Street,
PHILADELPHIA, PA.

MANUFACTURERS OF
Cotton Mercerized Tapes, Spool Tapes, Bindings and Narow Fabrics for Underwear and other Trades.

PAULSON, LINKROUM & CO.
COMMISSION MERCHANTS
COTTON YARNS
PHILADELPHIA NEW YORK CHICAGO

A. D. Salkeld & Bro.
COMMISSION MERCHANTS
COTTON AND WORSTED YARNS
366 BROADWAY Cor. Franklin St. NEW YORK
DEPT. FRED'K VIETOR & ACHELIS.

HAVE THAT SAFE FEELING
When buying products advertised in COTTON, you can always have that safe feeling that each advertiser is reliable and lives up to the claims made in his advertisement.

WOODWARD, BALDWIN & CO.
DRY GOODS
COMMISSION MERCHANTS
43-45 WORTH STREET, NEW YORK

Amory, Browne & Co.
Boston NewYork
SELLING AGENTS FOR
Nashau Manufacturing Company
Indian Head Mills Alabama
Samuel A. Crozier & Son
Lancaster Mills
Jackson Company
Parkhill Manufacturing Company
Wauregan Company
Lowe Manufacturing Co.
Quinebaug Company
B. B. & R. Knight (Export only)

ESTABLISHED 1872
H. & B. BEER
NEW ORLEANS
HENRY BEER EDGAR H. BRIGHT
J. WILLIAM BARKDULL C. MORGAN ABRAMS
MEMBERS OF
New Orleans Cotton Exchange
New Orleans Future Brokers Association
New York Stock Exchange
New York Cotton Exchange
New York Coffee Exchange
New York Produce Exchange
Chicago Board of Trade
Associate Members of the Liverpool Cotton Association
Private Wires to Principal Points

HUGHES FAWCETT
IMPORTER AND COMMISSION MERCHANT
LINEN YARNS
For Weaving, Knitting and all Purposes
TURKEY RED YARNS
For Towel Borders, Towellings and Bleaching Cloth
Linen Jacquard Harness Twine
And Every Description of Linen Thread and Twine
115 Franklin Street, : NEW YORK

STUART-HOWLAND CO.

Most complete line of

Electrical Merchandise

of every description.

BOSTON

The American Audit Co.

F. W. LAFRENTZ, C. P. A., Pres. Telephone Main 872
THEO. COCHEU, Jr., C. P. A., Vice Pres. Cable Address
A. F. LAFRENTZ, Secy. & Treas. Amdit New York

NEW YORK—100 Broadway (Home Office)
33rd St. and 5th Ave., Waldorf-Astoria.
ATLANTA BRANCH—1013-1017 4th National Bank Building.
CHICAGO—Marquette Building.
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WASHINGTON, D. C.—Colorado Building.
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Specialists in Cost Systems and Manufacturing Accounts.

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Mill Architect and Engineer

Specialty

Textile Mills and Water Power Developments

GREENVILLE, S. C.

The House of Taylor

600 Rooms
400 Baths

HOTEL MARTINIQUE

Broadway, 32d St., New York

125 pleasant Rooms, with private bath, facing large, open court,
$2.50 PER DAY

157 excellent Rooms, with private bath, facing street, southern exposure,
$3.00 PER DAY
Also Attractive Rooms from **$1.50**

The restaurant prices are most moderate. Equally convenient for amusements, shopping or business. One block from Penn'a Station.

Meet me at the Tuller for Value, Service, Home Comfort.

New HOTEL TULLER

Detroit, Michigan

Center of business on Grand Circus Park. Take Woodward car, get off at Adams Avenue.

ABSOLUTELY FIREPROOF

200	Rooms,	Private	Bath,	$1.50	Single,	$2.50	Up	Double
200	"	"	"	2.00	"	3.00	"	"
100	"	"	"	2.50	"	4.00	"	"
100	"	"	"	3.00 to 5.00	"	4.50	"	"

Total 600 Outside Rooms.

ALL ABSOLUTELY QUIET

Two Floors—Agents' Sample Rooms

New Unique Cafes and Cabaret Exellente

MOORE'S TEXTILE OILS

THE MOORE OIL COMPANY, Cincinnati, O.

Proper Locations for Cotton Mills.

United States Census figures show that since 1880 the consumption of cotton in mills of the cotton growing states has increased 1,502 per cent, as compared with an increase of only 93 per cent in all other states. In the twelve months ended August 31, 1916, Southern mills consumed 675,731 more bales of cotton than the mills of all other states. Three-fourths, or 9,000,000, of the total cotton spindles in the cotton growing States are tributary to Southern Railway tracks. Of the 200 knitting mills in the South over 125 are located along the Southern Railway. All the Southern woolen and silk mills are also on Southern Railway tracks.

There is a reason for this, and it is not difficult to understand.

The Southern Railway Lines enter and serve most completely those portions of the South where the textile industry is the greatest success, because there are found all the conditions which make for successful manufacture —the proper transportation facilities, the ease with which the raw materials and the needed fuel may be secured, the supply of good labor, the pure water, the low cost of power, and favorable local conditions.

Not only for textile plants but for all other industries the best advantages will be found in this territory.

If you have a plant to locate let us take up with you the question of the proper location. Your plans will be held confidential. Our knowledge of conditions at various points and our experience in locating other mills and the time of our agents in making special investigations are at your service, if desired.

M. V. RICHARDS
ROOM 131
Industrial and Agricultural Commissioner,
SOUTHERN RAILWAY, Washington, D. C.

BOSSON & LANE

Manufacturers and Importers

Castor Oil and Castor Oil Products

Turkey Red Oil	Soluble Grease
Alizarine Assistant	Soluble Wax
Castor Soap Oil	Soluble Rosin
Bleaching Oil	Olo Soffene
Monoline Oil	Snoflake Softener
Victroline	T. R. Soap
Soluble Oil	Oleine

Flaxhorn—The Delicate Finish.

Works and Office: ATLANTIC, MASS.

Make Your Bleach Out of Salt Water

WE manufacture a number of different types of cells for this purpose. All you require besides this is direct current of electricity and salt water.

Write for additional information.

Electro Chemical Company,

Formerly

National Laundry Machinery Co.

Dayton, Ohio, U.S.A.

VICTOR MILL STARCH

The Weaver's Friend

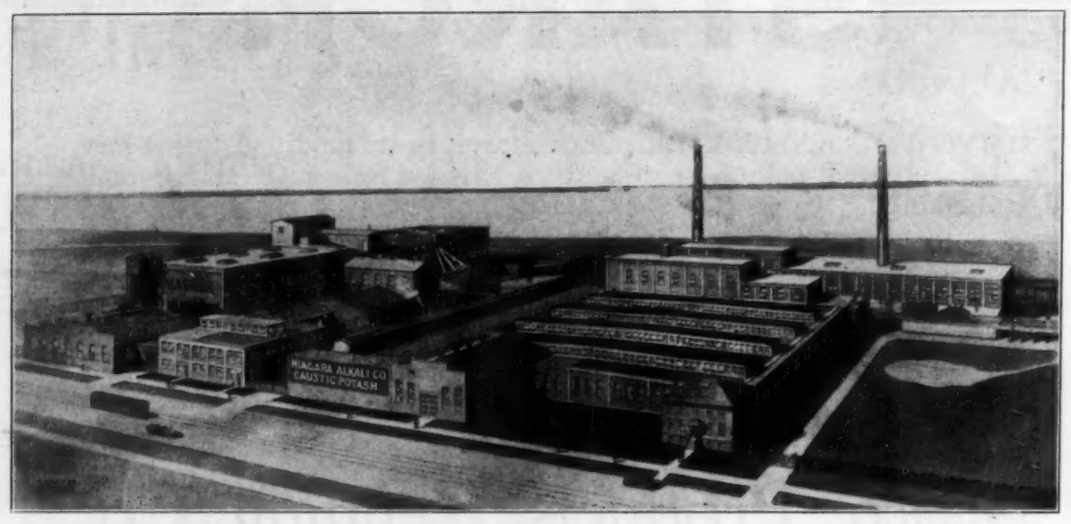
It boils thin—penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

THE KEEVER STARCH COMPANY, Columbus, Ohio

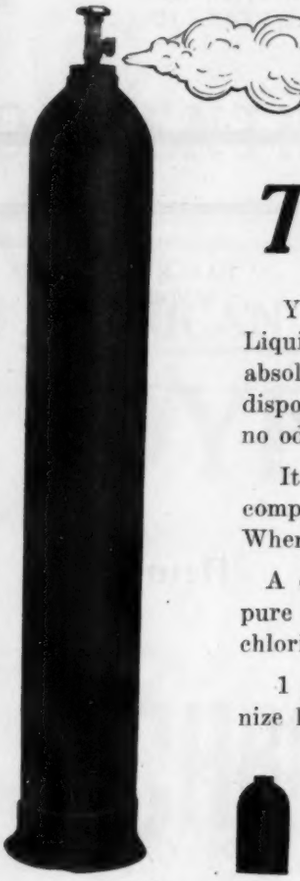
Southern Agent: MR. JAS. H. MAXWELL, Greenville, S. C.

If you are not already using VICTOR STARCH call on our representative for a demonstration at your convenience.



The Home of Liquid Chlorine

The Only 100% Bleach



Cylinder with Cap Off
Height 54 inches

You need no material changes in your present method of bleaching to use Liquid Chlorine. It is a very simple process and easy to handle. There is absolutely no loss in the preparation of the bleaching solution, and no sludge to dispose of. Less acid and less washing is required. Less water is used and no odor is apparent.

It is a highly purified and specially prepared chlorine. By refrigeration and compression, it is liquified and placed in steel cylinders containing 100 lbs. When released from the valve it immediately gasifies.

A chemical analysis of Liquid Chlorine shows it to be practically chemically pure chlorine gas. A good quality of bleaching powder contains 36% available chlorine, while Liquid Chlorine contains 100%.

1 pound of Liquid Chlorine is equal to 6 lbs. of lime. You will readily recognize how much money this will save you in both bleach and freight charges.

Our representative will gladly demonstrate Liquid Chlorine in your mill. Just ask us to send him.

Write today for interesting booklet. A post card will do.

Electro Bleaching Gas Company

General Offices

18 East 41st Street **New York City**

STARCH

DO YOU KNOW THAT Corn Starch in its modified forms has replaced potato, sago and cassave starches in sizing and finishing?

Every mill that has changed over gives the same reason—"CORN STARCH PRODUCES THE RESULT FOR LESS MONEY."

Have *you* discovered the advantage of using Modified Corn Starches, Dextrine, Corn Syrup and Corn Sugar?

We are prepared to show you how to use these products to your advantage and improve your processes.

For full information address

Corn Products Refining Co.

NEW YORK, N. Y.

Southern Office, Greenville, S. C.

STARCH

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RECTOR 8840, 6662

CABLE ADDRESS
MADEROBRO

Madero Bros.

Incorporated

Chemical Dept.

115 Broadway, New York

QUEBRACHO EXTRACT
LOGWOOD EXTRACT
SOLID LOGWOOD
FUSTIC EXTRACT
HEMATINE CRYSTALS
ANILINE DYES

SODA ASH
CAUSTIC SODA
BLUE VITRIOL
CHLORIDE OF LIME
SULPHURIC ACID
NITRIC ACID
MURIATIC ACID
AMMONIA
CHLORATE OF POTASH
MURIATE OF POTASH
ALL OTHER CHEMICALS
BICHROMATE OF SODA
BICHROMATE OF POTASH
CITRIC ACID
TARTARIC ACID
TANNIC ACID

MADE IN U. S. A.

SOLUBILITY BRILLIANCY

HOLLAND ANILINE CO.
118 W. Kinzie Street
CHICAGO

METHYL VIOLET
METHYLENE BLUE
BISMARCK BROWN

Works:
HOLLAND, MICH.

CONCENTRATION

Caustic Soda	Cocoanut Oil
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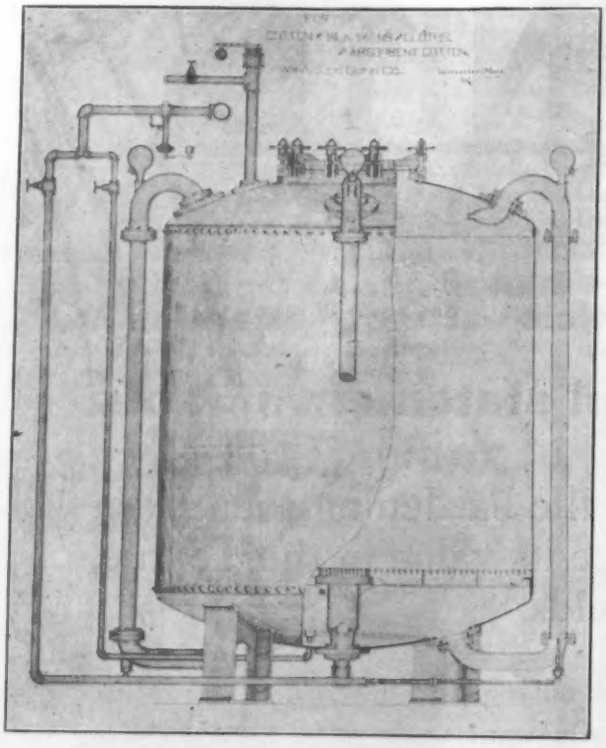

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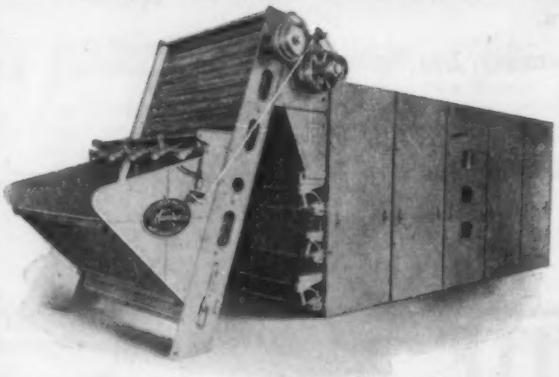

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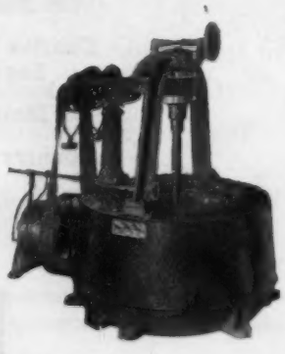

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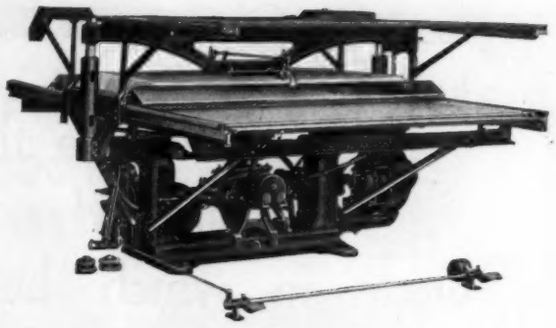

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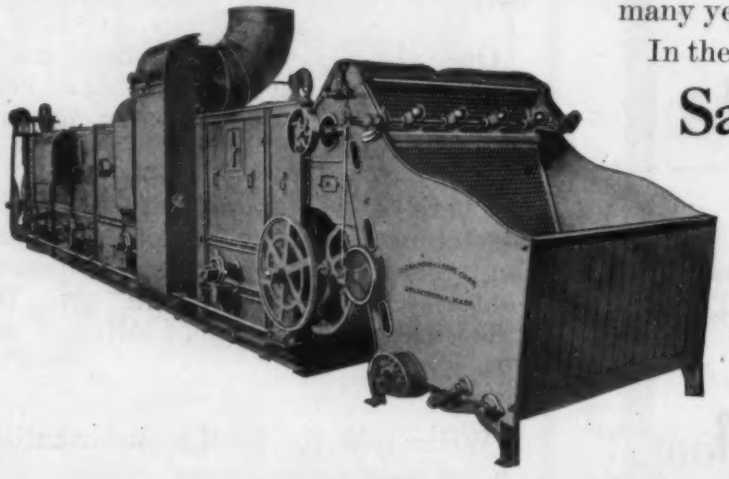

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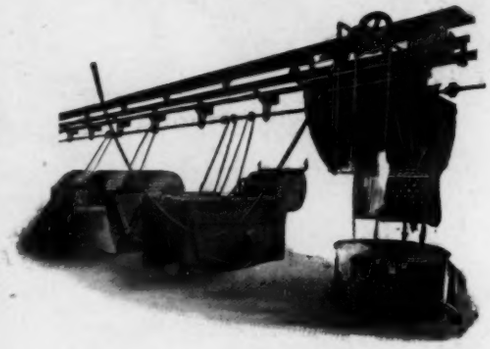

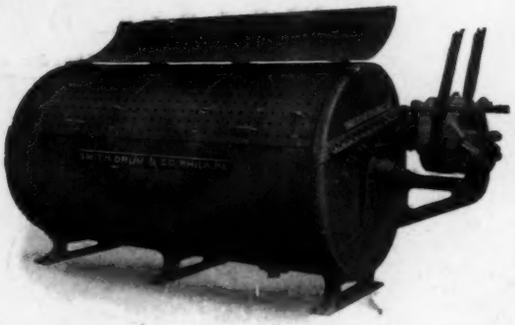

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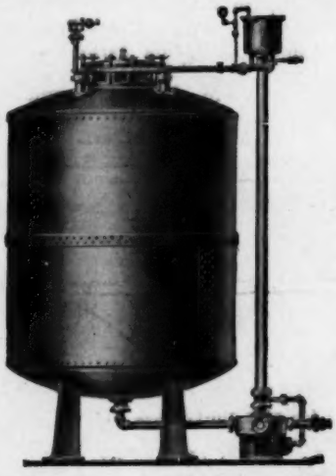

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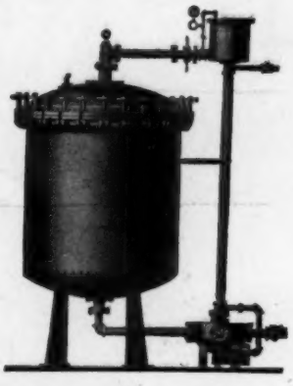

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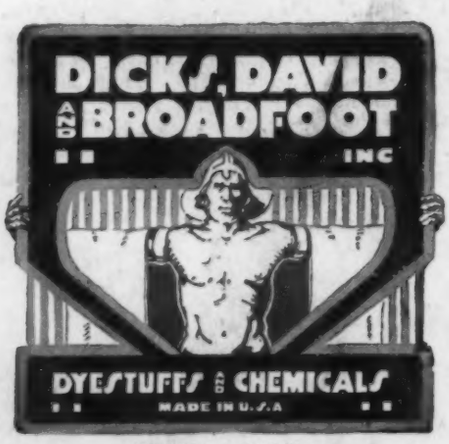

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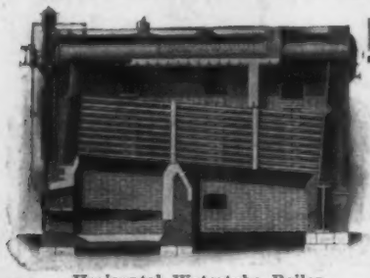

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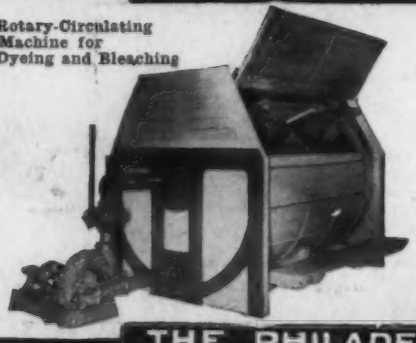

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